

Syllabus

PLATO Course Principles of Engineering and Technology, Semester B

Course Overview

This one-semester course is intended to help you familiarize yourself with the process of engineering design and examine manufacturing technologies and processes. This course has seventeen lessons organized into four units. Each unit has a Unit Activity and each lesson contains one or more Lesson Activities.

This course will cover the concepts in engineering design, manufacturing processes and materials, communication skills, and team and resource management.

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:

- Explain the design process.
- Examine methods for evaluating problems and generating creative solutions.
- Compare energy sources and explain the principles of electrical power generation and transmission.
- Analyze various manufacturing processes and materials.
- Examine the applications of different types of engineering control systems.
- Analyze safety systems and demonstrate safe working habits.
- Identify some important employability characteristics.
- Demonstrate good communication skills.

- Demonstrate time, task, and resource management.
- Discuss the importance of teamwork and demonstrate team management skills.

Prerequisite Skills

Principles of Engineering and Technology Semester B 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 B 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
Pretest. <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>	4	0%
Module. <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>	17	20%
Discussion. <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>	4	20%
Unit Activity. <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>	4	20%
Posttest. <i>The posttest appears at the end of the unit and mirrors the pretest in structure, content, and complexity.</i>	4	20%
End of Semester Test. <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%
Total	34	100%

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

Unit 1: Engineering Design

Summary

In this unit, you will examine the process of engineering design and apply the principles of ideation and decision-making strategies in engineering design. You will explain the importance of creativity and resourcefulness in the workplace. You will describe the fundamental steps of analyzing and finding solutions to a problem.

Day	Activity/Objective	Type
1 day: 1	Syllabus and Plato Student Orientation <i>Review the Plato Student Orientation and Course Syllabus at the beginning of this course.</i>	Course Orientation
4 days: 2–5	The Engineering Design Process <i>Describe and analyze the stages of the engineering design process and identify the constraints in design.</i>	Lesson
4 days: 6–9	Creative Resourcefulness <i>Describe creativity and resourcefulness examples.</i>	Lesson
3 days: 10–12	Critical Thinking and Problem Solving <i>Demonstrate critical-thinking and problem-solving skills by analyzing and resolving problems that arise in completing assigned tasks.</i>	Lesson
1 day: 13	Space Jumble	Game
4 days: 14–17	Unit Activity/Threaded Discussion—Unit 1	Activity
1 day: 18	Post-test—Unit 1	Assessment

Unit 2: Manufacturing and Safety

Summary

In this unit, you will compare energy sources and describe the principles of electrical power generation and transmission. You will analyze the properties of different types of engineering materials. You will describe manufacturing processes and examine industrial automation concepts. You will identify the components of various control systems and discuss their applications. You will analyze safety systems and demonstrate safe working habits.

Day	Activity/Objective	Type
4 days: 19–22	Energy Sources <i>Compare energy sources and describe power generation systems.</i>	Lesson
4 days: 23–26	Properties of Materials <i>Identify the major types of engineering materials and analyze their properties.</i>	Lesson
4 days: 27–30	Manufacturing Processes and Automation <i>Analyze manufacturing processes and describe industrial automation concepts.</i>	Lesson
4 days: 31–34	Control Systems <i>Describe the types of engineering control systems and explain their applications.</i>	Lesson
4 days: 35–38	Safety in Engineering <i>Demonstrate safe working habits and examine safety systems in engineering.</i>	Lesson
1 day: 39	Thwack-A-Mole	Game
4 days: 40–43	Unit Activity/Threaded Discussion—Unit 2	Activity
1 day: 44	Post-test—Unit 2	Assessment

Unit 3: Communication

Summary

In this unit, you will describe appropriate workplace etiquette. You will apply effective reading and writing strategies. You will demonstrate effective speaking and listening skills. You will analyze the use of various telecommunication devices and services. You will discuss strategies for providing improved customer satisfaction.

Day	Activity/Objective	Type
4 days: 45–48	Self-Representation <i>Identify positive self-representation skills by dressing appropriately and using language and manners suitable for the workplace.</i>	Lesson
3 days: 49–51	Reading and Writing <i>Describe effective reading and writing skills by reading and interpreting workplace documents and writing clearly.</i>	Lesson
3 days: 52–54	Speaking and Listening <i>Differentiate between verbal and nonverbal communication, evaluate elements of effective communication and active listening, and reflect on ways to improve communication skills.</i>	Lesson
4 days: 55–58	Telecommunications <i>Demonstrate proficiency with telecommunications by selecting and using appropriate devices, services, and applications.</i>	Lesson
4 days: 59–62	Customer Service <i>Examine and reflect upon customer service skills and best practices, differentiate between internal and external customers, and describe strategies for improving customer satisfaction.</i>	Lesson
1 day: 63	Para Jumble	Game
4 days: 64–67	Unit Activity/Threaded Discussion—Unit 3	Activity
1 day: 68	Post-test—Unit 3	Assessment

Unit 4: Team Management

Summary

In this unit, you will explain how to prioritize tasks to meet timelines and demonstrate resource management skills. You will identify leadership qualities required to build an effective team. You will examine strategies to resolve workplace conflicts and demonstrate diversity awareness.

Day	Activity/Objective	Type
4 days: 69–72	Time, Task, and Resource Management <i>Demonstrate time, task, and resource management skills by organizing and implementing a productive plan of work.</i>	Lesson
4 days: 73–76	Teamwork <i>Describe teamwork skills and identify leadership skills to successfully lead a team.</i>	Lesson
3 days: 77–79	Diversity Awareness <i>Identify what diversity awareness includes.</i>	Lesson
3 days: 80–82	Conflict Resolution <i>Identify conflict-resolution skills by negotiating diplomatic solutions to avoid interpersonal and workplace issues.</i>	Lesson
1 day: 83	Space Jumble	Game
4 days: 84–87	Unit Activity/Threaded Discussion—Unit 4	Activity
1 day: 88	Post-test—Unit 4	Assessment
1 day: 89	Semester Review	
1 day: 90	End-of-Semester Test	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 B](#).