

Connecticut CTE

# **Engineering Technology (Grades 9-12)**

## Engineering Technology

### A Engineering Technology ENG

- 1 Identify the roles, responsibilities and requirements of engineering. ENG.01
  - a Describe the following engineering fields: mechanical, chemical, civil, and electrical.\*(A1) ENG.01.01
  - b Identify the following job functions and responsibilities: research and development, design, production, supervision, management, testing, and analysis in mechanical, chemical, civil, and electrical engineering. \*(A2) ENG.01.02
  - c Identify the following educational requirements in engineering: associate, bachelor, master, and doctorate degrees.\*(A3) ENG.01.03
  - d Describe the employment opportunities of an engineer. ENG.01.04
  - e Describe ethics related to engineering in the following situations: environmental, sustainable engineering, and corrupt practices.\*(A4) ENG.01.05
- 2 Use the design process to solve problems by creating and refining prototypes. ENG.02
  - a Identify the components of the design process: define the problem, brainstorm, research, develop solutions, prototype, test/evaluate, and communicate results.\*(H25) ENG.02.01
  - b Identify the elements of a well-written problem statement.\*(H26) ENG.02.02
  - c Describe the process for researching relevant information.\*(H28) ENG.02.03
  - d Describe the process of brainstorming.\*(H27) ENG.02.04
  - e Brainstorm possible solutions. ENG.02.05
  - f Analyze and research between alternate solutions. ENG.02.06
  - g Describe the process of developing a solution.\*(H29) ENG.02.07
  - h Develop details of a solution. ENG.02.08
  - i Build a prototype from working drawings using appropriate materials.\*(H30) ENG.02.09
  - j Test prototype to defined criteria.\*(H31) ENG.02.10
  - k Redesign prototypes. ENG.02.11
  - l Communicate processes and results. ENG.02.12
  - m Use a variety of productivity software to explain the results of the design process, including, spreadsheets, word processing, data analysis, and presentations.\*(H32) ENG.02.13
- 3 Ensure quality control using the major components of manufacturing processes including measurement systems, tools and instruments to produce a product. ENG.03
  - a Explain the major manufacturing processes. ENG.03.01



- 7 Identify and demonstrate the use of various software programs used in the engineering field. **ENG.07**
- a Identify available resources for researching problem solutions.\*(F15) **ENG.07.01**
  - b Use word processing software to develop reports.\*(F16) **ENG.07.02**
  - c Use presentation software to develop oral presentation of findings.\*(F17) **ENG.07.03**
  - d Describe and demonstrate the process for using CAD in a design solution.\*(F18) **ENG.07.04**
  - e Use spreadsheet software to develop tables, graphs and charts and track data.\*(F19) **ENG.07.05**
- 8 Demonstrate the application of science and math principles to the electrical engineering process. **ENG.08**
- a Describe and apply the following electricity principles: Ohm's, Watt's, series, parallel, combination circuits, AC/DC systems, and conductors/insulators.\*(G22) **ENG.08.02**
  - b Use appropriate electrical units to solve problems. **ENG.08.03**
  - c Draw a circuit diagram and lay out the circuit. **ENG.08.04**
  - d Describe work in electrical systems. **ENG.08.05**
  - e Explain rate in electrical systems. **ENG.08.06**
  - f Describe resistance in electrical systems. **ENG.08.07**
- 9 Demonstrate the application of science and math principles to the fluids engineering process. **ENG.09**
- a Identify what causes resistance in a fluid system. **ENG.09.01**
  - b Describe the following components and applications of fluid power principles: reservoir, fluid conductors, valves, pumps, actuators, Pascal's Law, and Bernoulli's Principle.\*(G23) **ENG.09.02**
  - c Describe components of hydraulic and pneumatic systems. **ENG.09.03**
  - d Describe work in electrical, mechanical, fluid and thermal systems. **ENG.09.04**
  - e Explain rate in electrical, mechanical, fluid and thermal systems. **ENG.09.05**
  - f Describe resistance in electrical, mechanical, fluid and thermal systems. **ENG.09.06**
- 10 Demonstrate the application of science and math principles to the thermal engineering process. **ENG.10**
- a Identify the three ways heat is transferred. **ENG.10.01**
  - b Describe the following principles and applications of thermodynamics: heat flow and transfer, convection, conduction, radiation, temperature scales, and conductors/insulators.\*(G24) **ENG.10.02**
  - c Solve thermal problems using appropriate units. **ENG.10.03**
  - d Describe work in thermal systems. **ENG.10.04**

- e Explain rate in thermal systems. [ENG.10.05](#)
- f Describe resistance in thermal systems. [ENG.10.06](#)
- 11 Demonstrate the application of science and math principles to the mechanical engineering process. [ENG.11](#)
  - a Describe and apply the following mechanical systems principles: Law of Conservation of Energy, six simple machines, mechanical advantage, efficiency, work, rate, and friction/resistance.(G21) [ENG.11.01](#)
  - b Solve problems using appropriate units in engineering systems. [ENG.11.02](#)
  - c Describe and apply the following statics principles: vectoring to predict resultant forces, equilibrium, trusses, and moment of inertia.\*(G20) [ENG.11.03](#)
  - d Explain the effects of gear ratios. [ENG.11.04](#)
  - e Describe work in mechanical systems. [ENG.11.05](#)
  - f Explain rate in mechanical systems. [ENG.11.06](#)
  - g Describe resistance in mechanical systems. [ENG.11.07](#)