

ENGINEERING TECHNOLOGY—CCTE STANDARDS

HIGH SCHOOL

CAREER AWARENESS

- Describe the following engineering fields: mechanical, chemical, civil, and electrical.
- Identify the following job functions and responsibilities: research and development, design, production, supervision, management, testing, and analysis in mechanical, chemical, civil, and electrical engineering.
- Identify the following educational requirements in engineering: associate, bachelor, master, and doctorate degrees.
- Describe ethics related to engineering in the following situations: environmental, sustainable engineering, and corrupt practices.

SAFETY

- Explain and demonstrate the proper use of personal protective equipment (PPE).
- Describe and demonstrate the proper use of engineering laboratory equipment.

TEAMWORK

- Identify the roles and responsibilities of the following engineering design team members: team leader, designers, reporters, testers, and fabricators.
- Identify the following characteristics of an effective design team: team norms, leadership, responsibility, respect, rapport, and time management.

MATERIALS

- Describe the following mechanical properties of steel, concrete, wood, and plastic: ductility/brittleness, tension, shear, and compression.
- Explain the process used for selecting the correct materials for specific functions.
- Test materials for specific characteristics.

PRODUCTION PROCESS

- Explain the following quality controls: geometric dimensioning and tolerances, and go-no go gauge.
- Use the following measurement tools and instruments: rulers, micrometers, and vernier calipers.
- Identify the following elementary statistical process controls: distribution curves, normal curves, and skew curves.

SOFTWARE

- Identify available digital resources for researching problem solutions.
- Use word processing software to develop reports.
- Use presentation software to develop oral presentation of findings.
- Describe and demonstrate the process for using CAD in a design solution.
- Use spreadsheet software to develop tables, graphs, charts, and to track data.

ENGINEERING PRINCIPLES

- Describe and apply the following statics principles: vectoring to predict resultant forces, equilibrium, trusses, and moment of inertia.
- Describe and apply the following mechanical systems principles: Law of Conservation of Energy, six simple machines, mechanical advantage, efficiency, work, rate, and friction/resistance.
- Describe and apply the following electricity principles: Ohm's, Watt's, series, parallel, combination circuits, AC/DC systems, and conductors/insulators.
- Describe the following components and applications of fluid power principles: reservoir, fluid conductors, valves, pumps, actuators, Pascal's Law, and Bernoulli's Principle.
- Describe the following principles and applications of thermodynamics: heat flow and transfer, convection, conduction, radiation, temperature scales, and conductors/insulators.

DESIGN PROCESS

- Identify the components of the design process: define the problem, brainstorm, research, develop solutions, prototype, test/evaluate, and communicate results.
- Identify the elements of a well-written problem statement.
- Describe the process of brainstorming.
- Describe the process for researching relevant information.
- Describe the process of developing a solution.
- Build a prototype from working drawings using appropriate materials.
- Test prototype to defined criteria.
- Use a variety of productivity software to explain the results of the design process, including, spreadsheets, word processing, data analysis, and presentations.