Texas CTE

Manufacturing (2010): Grade 9

Adopted 2010

Principles of Manufacturing

(1) The student describes the importance of teamwork, leadership, integrity, honesty, work habits, and organizational skills. The student is expected to:

- (A) describe how teams function;
- (B) use teamwork to solve problems;
- (C) distinguish team roles such as team leaders and team members;
- (D) identify characteristics of good leaders;
- (E) identify employers' work expectations;
- (F) discuss Equal Employment Opportunity law in the workplace;
- (G) use time-management techniques to develop work schedules;
- (H) describe how teams measure results; and
- (I) develop a method to reward team performance.

(2) The student explores the employability characteristics of a successful worker in the global economy. The student is expected to:

- (A) explore academic knowledge and skills required for postsecondary education;
- (B) identify employers' expectations to foster positive customer satisfaction;
- (C) demonstrate the skills required in the workplace such as interviewing skills, flexibility, willingness to learn new skills and acquire knowledge, self-discipline, self-worth, positive attitude, and integrity in a work situation;
- (D) evaluate personal career goals;
- (E) communicate effectively with others to clarify objectives; and
- (F) demonstrate skills related to health and safety in the workplace, as specified by appropriate government regulations.

(3) The student describes how a systems model can be used to describe manufacturing and technological activities. The student is expected to:

- (A) identify the manufacturing processes such as input, output, and feedback;
- (B) describe system differences such as open and closed; and
- (C) describe how technological systems interact to achieve common goals.

(4) The student applies manufacturing concepts to specific problems. The student is expected to:

- (A) distinguish between disciplines such as engineering, science, and technology;
- (B) analyze engineering concepts to solve practical problems;
- (C) use problem-solving tools such as calculators and computers;
- (D) evaluate computers for simulation tasks;
- (E) use tools for laboratory equipment testing;
- (F) use precision measuring instruments; and
- (G) evaluate software to design quality assurance models.

(5) The student designs products or systems using appropriate processes and techniques. The student is expected to:

- (A) improve a product that meets a specified need;
- (B) identify system improvements such as quality, reliability, and safety;
- (C) produce engineering drawings using standard technical communication techniques; and
- (D) research the patenting process.

(6) The student investigates emerging and innovative applications of technology in engineering. The student is expected to:

- (A) report on innovative applications of technology in engineering; and
- (B) experiment with new technologies.

(7) The student describes quality and how it is measured in manufacturing. The student is expected to:

- (A) evaluate different quality control applications in manufacturing; and
- (B) research how the quality of products and services affects engineering decisions.

(8) The student manufactures products or systems using the appropriate tools, equipment, machines, materials, and technical processes. The student is expected to:

- (A) analyze engineering properties such as chemical, mechanical, and physical;
- (B) analyze the processes needed to complete a project;
- (C) use a variety of tools such as equipment and machines; and
- (D) produce an item that is student designed.

(9) The student practices safe work habits. The student is expected to:

(A) master relevant safety tests;

(B) analyze hazardous materials; and

(C) safely dispose of hazardous materials.

(10) The student describes the importance of maintenance. The student is expected to:

(A) perform maintenance on selected equipment;

(B) store materials correctly; and

(C) analyze the results of improper maintenance.

(11) The student manages a manufacturing project. The student is expected to:

(A) participate in the operation of a manufacturing project; and

(B) develop a plan for completing an individual project.

(12) The student applies the appropriate codes, laws, standards, or regulations such as Occupational Safety and Health Administration, National Electrical Code, American Society for Testing Materials, standard symbols, and line weights. The student is expected to:

(A) research the importance of regulations such as codes, laws, and standards; and

(B) follow the appropriate regulations.

(13) The student describes the intended and unintended effects of technological solutions to the manufacturing process. The student is expected to:

(A) evaluate an assessment strategy such as the risks and benefits of engineering activities; and

(B) demonstrate how engineering changes environments.

(14) The student describes the factors that affect the evolution of technology. The student is expected to:

(A) analyze how changes in technology affect manufacturing practices;

(B) evaluate how the development of technology in manufacturing is influenced by past events;

(C) analyze the international effects of technology;

(D) demonstrate how advancements in technology have affected the field of engineering;

(E) evaluate the factors that affect the implementation of new ideas; and

(F) analyze how manufacturing evolves.

(15) The student solves problems, thinks critically, and makes decisions related to manufacturing. The student is expected to:

(A) apply an engineering approach to problem solving to improve a manufactured product;

(B) apply critical-thinking strategies to the analysis of proposed solutions; and

(C) apply decision-making techniques to engineering solutions.

(16) The student identifies the factors that influence the cost of an item or service. The student is expected to:

(A) defend a budget for a project; and

(B) determine the most effective strategies to minimize costs.

(17) The student applies communication, mathematics, and science knowledge and skills to manufacturing activities. The student is expected to:

(A) demonstrate communication techniques consistent with industry standards;

(B) locate relevant information needed to solve problems;

(C) apply mathematics concepts to solve manufacturing problems;

(D) analyze science principles used to solve problems; and

(E) use the appropriate units of measure.

(18) The student describes the relationship between manufacturing and marketing. The student is expected to:

(A) prepare a marketing plan for a product;

(B) analyze the effect of customer satisfaction on the image of a product; and

(C) analyze how customer demands influence the design of an object.

(19) The student selects and reports on career opportunities, requirements, and expectations in engineering and technology. The student is expected to:

(A) investigate an area of interest in manufacturing;

(B) analyze the various specializations in manufacturing; and

(C) describe the functions of engineers, technologists, and technicians.