eDynamic Learning Course Title: Robotics 1a/1b

State: TX
State Course Title: Robotics I
State Course Code: 130.408
State Standards: Robotics
Date of Standards: 2015

TEKS	Course Title (a or b), if applicable, e.g. Game Design 1a	Unit Name(s)	Lesson(s) Numbers
(1) The student demonstrates professional standards / employability skills as required by business and industry.			
(A) demonstrate knowledge of how to dress appropriately, speak politely, and conduct oneself in a manner appropriate for the profession;	Robotics 1a: Introduction	Unit 1: Work With Robots	Lesson 3
(B) demonstrate the ability to cooperate, contribute, and collaborate as a member of a group in an effort to achieve a positive collective outcome;	Robotics 1a: Introduction	Unit 8: Keeping Robots and Coworkers Happy	Lessons 1-5
(C) present written and oral communication in a clear, concise, and effective manner, including explaining and justifying actions;	Robotics 1a: Introduction	Unit 8: Keeping Robots and Coworkers Happy	Lessons 1-5
(D) demonstrate time-management skills in prioritizing tasks, following schedules, and performing goal-relevant activities in a way that produces efficient results; and	Robotics 1a: Introduction	Unit 1: Work With Robots	Lesson 2
(E) demonstrate punctuality, dependability, reliability, and responsibility in performing assigned tasks as directed.	Robotics 1a: Introduction	Unit 1: Work With Robots	Lesson 3
(2) The student demonstrates the skills necessary for success in a technical career.			
(A) distinguish the differences among an engineering technician, engineering technologist, and engineer;	Robotics 1a: Introduction	Unit 1: Work With Robots	Lesson 3
(B) identify employment and career opportunities;	Robotics 1a: Introduction	Unit 1: Work With Robots	Lesson 3
(C) identify industry certifications;	Robotics 1a: Introduction	Unit 1: Work With Robots	Lessons 2, 3
(D) discuss ethical issues related to engineering and technology and incorporate proper ethics in submitted projects;	Robotics 1a: Introduction	Unit 1: Work With Robots	Lesson 4
(E) identify and demonstrate respect for diversity in the workplace;	Robotics 1a: Introduction	Unit 1: Work With Robots	Lesson 4
(F) identify appropriate actions and consequences relating to discrimination, harassment, and inequality;	Robotics 1a: Introduction	Unit 8: Keeping Robots and Coworkers Happy	Lessons 1-6
(G) explore robotic engineering careers and preparation programs;	Robotics 1a: Introduction	Unit 1: Work With Robots	Lesson 3
(H) explore career preparation learning experiences, including job shadowing, mentoring, and apprenticeship training; and	Robotics 1a: Introduction	Unit 1: Work With Robots	Lesson 2

(I) discuss Accreditation Board for Engineering and Technology (ABET) accreditation and implications.	Robotics 1a: Introduction	Unit 1: Work With Robots	Lesson 2
(3) The student participates in team projects in various roles.			
(A) explain the importance of teamwork in the field of robotics;	Robotics 1a: Introduction	Unit 8: Keeping Robots and Coworkers Happy	Activity
(B) apply principles of effective problem solving in teams to collaboration and conflict resolution; and	Robotics 1a: Introduction	Unit 1: Work With Robots	Lesson 3
(C) demonstrate proper attitudes as a team leader and team member	Robotics 1a: Introduction	Unit 8: Keeping Robots and Coworkers Happy	Activity
(4) The student develops skills for managing a project.			
(A) implement project management methodologies, including initiating, planning, executing, monitoring and controlling, and closing a project;	Robotics 1b: Intelligent Robots	Unit 8: To the Drawing Board	Lesson 1
(B) develop a project schedule and complete work according to established criteria;	Robotics 1a: Introduction	Unit 8: Keeping Robots and Coworkers Happy	Lessons 1-6
(C) participate in the organization and operation of a real or simulated engineering project; and	Robotics 1a: Introduction	Unit 6: Robot Physics	Activity
(D) develop a plan for production of an individual product.	Robotics 1a: Introduction	Unit 8: Keeping Robots and Co-Workers Happy	Activity
(5) The student practices safe and proper work habits.			
(A) master relevant safety tests;	Robotics 1a: Introduction	Unit 2: Health and Safety	Lessons 1-4
(B) comply with safety guidelines as described in various manuals, instructions, and regulations;	Robotics 1a: Introduction	Unit 2: Health and Safety	Lessons 1, 2, 4
(C) identify governmental and organizational regulations for health and safety in the workplace related to electronics;	Robotics 1a: Introduction	Unit 2: Health and Safety	Lessons 1-4
(D) identify and classify hazardous materials and wastes according to Occupational Safety and Health Administration (OSHA) regulations;	Robotics 1a: Introduction	Unit 2: Health and Safety	Lessons 1-4
(E) dispose of hazardous materials and wastes appropriately;	Robotics 1a: Introduction	Unit 2: Health and Safety	Lessons 1, 2, 4
(F) perform maintenance on selected tools, equipment, and machines;	Robotics 1b: Intelligent Robots	Unit 6: Tools, Equipment, and Materials	Activity
(G) handle and store tools and materials correctly; and	Robotics 1a: Introduction	Unit 2: Health and Safety	Lessons 1-4
(H) describe the results of improper maintenance of material, tools, and equipment.	Robotics 1a: Introduction	Unit 2: Health and Safety	Lessons 1-4
(6) The student develops the ability to use and maintain technological products, processes, and systems.			

(A) demonstrate the use of computers to manipulate a robotic or automated system and associated subsystems;	Robotics 1a: Introduction	Unit 5: Robot Mechanics and Motion	Lessons 1-3
(B) maintain systems to ensure safe and proper function and precision operation;	Robotics 1a: Introduction	Unit 2: Health and Safety	Lessons 1-4
(C) describe feedback control loops used to provide information; and	Robotics 1b: Intelligent Robots	Unit 3: Robotic Programming	Lessons 4, 5
(D) describe types and functions of sensors used in robotic systems.	Robotics 1b: Intelligent Robots	Unit 4: Sensors and Circuitry	Lesson 1
(7) The student develops an understanding of engineering principles and fundamental physics.			
(A) demonstrate knowledge of Newton's Laws as applied to robotics such as rotational dynamics, torque, weight, friction, and traction factors required for the operation of robotic systems;	Robotics 1a: Introduction	Unit 6: Robot Physics	Activity
(B) demonstrate knowledge of motors, gears, gear ratios, and gear trains used in the robotic systems;	Robotics 1b: Intelligent Robots	Unit 5: Output Systems	Lessons 1-4
(C) describe the application of the six simple machines to robotics;	Robotics 1a: Introduction	Unit 3: Simple Machines, Mighty Mechanisms	Lessons 1-6
(D) describe the operation of direct current (DC) motors, including control, speed, and torque; and	Robotics 1b: Intelligent Robots	Unit 3: Robotic Programming	Lessons 4, 5
(E) describe the operation of servo motors, including control, angle, and torque.	Robotics 1b: Intelligent Robots	Unit 5: Output Systems	Lessons 1-4
(8) The student develops an understanding of the characteristics and scope of manipulators, accumulators, and end effectors required for a robotic or automated system to function.			
(A) describe the relationship between robotic arm construction and robot stability;	Robotics 1a: Introduction	Unit 5: Robot Mechanics and Motion	Activity
(B) describe the relationship between torque and gear ratio to weight of payload in a robotic arm operation; and	Robotics 1a: Introduction	Unit 5: Robot Mechanics and Motion	Lessons 1-5
(C) demonstrate knowledge of linkages and gearing in end effectors used in a robotic arm system.	Robotics 1a: Introduction	Unit 5: Robot Mechanics and Motion	Lessons 1-3
(9) The student uses engineering design methodologies.			
(A) demonstrate an understanding of and discuss the design process;	Robotics 1a: Introduction	Unit 5: Robot Mechanics and Motion	Lessons 1, 2
(B) think critically, identify the system constraints, and make fact-based decisions;	Robotics 1a: Introduction	Unit 8: Keeping Robots and Coworkers Happy	Lessons 1-6
(C) apply testing and reiteration strategies to develop or improve a product;	Robotics 1a: Introduction	Unit 7: Engineering Design Methods	Lesson 4
(D) apply decision-making strategies when developing solutions;	Robotics 1a: Introduction	Unit 7: Engineering Design Methods	Lessons 1-3
(E) identify quality-control issues in engineering design and production;	Robotics 1a: Introduction	Unit 7: Engineering Design Methods	Lesson 5

(F) describe perceptions of the quality of products and how they affect engineering decisions;	Robotics 1a: Introduction	Unit 7: Engineering Design Methods	Lesson 5
(G) use an engineering notebook to document the project design process as a legal document; and	Robotics 1a: Introduction	Unit 7: Engineering Design Methods	Lesson 1
(H) interpret industry standard system schematics.	Robotics 1b: Intelligent Robots	Unit 1: Power Supplies and Energy Sources	Activity
(10) The student learns the function and application of the tools, equipment, and materials used in robotic and automated systems through specific project-based assessments.			
(A) use tools and laboratory equipment in a safe manner to construct and repair systems;	Robotics 1a: Introduction	Unit 2: Health and Safety	Lessons 1-4
(B) use precision measuring instruments to analyze systems and prototypes; and	Robotics 1a: Introduction	Unit 4: Let's Build a Model	Lesson 1
(C) use multiple software applications to simulate robot behavior and present concepts.	Robotics 1a: Introduction	Unit 4: Let's Build a Model	Lesson 2
(11) The student produces a product using the appropriate tools, materials, and techniques.			
(A) identify and describe the steps needed to produce a prototype;	Robotics 1a: Introduction	Unit 7: Engineering Design Methods	Lesson 4
(B) identify and use appropriate tools, equipment, machines, and materials to produce the prototype;	Robotics 1b: Intelligent Robots	Unit 6: Tools, Equipment, and Materials	Activity
(C) construct a robotic or automated system to perform specified operations using the design process;	Robotics 1b: Intelligent Robots	Unit 8: To the Drawing Board	Activity
(D) test and evaluate the design in relation to pre-established requirements such as criteria and constraints;	Robotics 1a: Introduction	Unit 7: Engineering Design Methods	Lessons 1-3
(E) refine the design of a robotic or automated system to ensure quality, efficiency, and manufacturability of the final product; and	Robotics 1a: Introduction	Unit 7: Engineering Design Methods	Lesson 5
(F) present the final product using a variety of media.	Robotics 1a: Introduction	Unit 6: Robot Physics	Activity