



# ROBOTICS & AUTOMATION II

## Year at a Glance (YAG)



FIRST SEMESTER		SECOND SEMESTER	
First Nine Weeks		Third Nine Weeks	
<p><b>TEKS</b> 1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1I, 1J, 1K</p>	<p><b>Career Exploration</b> This Science, Technology, Engineering, and Mathematics (STEM) Robotics II Overview unit is designed to provide students with the opportunity to explore training, education, employment role and career opportunities. This unit offers students basic technical skills necessary to fulfill careers in the workforce. Upon culmination of the unit, students will present their continued findings of robotic engineering careers and programs to prepare for the field.</p>	<p><b>TEKS</b> 7A, 7B, 7C, 7D, 7E, 7F, 7G, 7H, 7I, 7J</p>	<p><b>Advanced Mathematics and Physics in Robotic Systems</b> This exciting unit will have students apply the concepts of acceleration and velocity to robotic systems and use geometry to calculate robot navigation and create a path with sensory movement. The final activity will have students demonstrate how they can program their robot to do such functions such as jump, loop or switch positions.</p>
<p>2A, 2B, 2C, 2D, 2E, 2F, 2G</p>	<p><b>Real-World Mathematical Processes</b> The process standards weave the other knowledge and skills together so that students may be successful problem solvers and use mathematics efficiently and effectively in daily life. They are integrated at every grade level and course. Students will select appropriate tools and techniques to solve problems and effectively communicate mathematical ideas, reasoning, and their implications. Students will use mathematical relationships to generate solutions and make connections and predictions and analyze mathematical relationships to connect and communicate mathematical ideas. In this unit, students will apply mathematics to problems arising in everyday life, society, and the workplace. The culminating activity will include students creating representations to communicate mathematical ideas.</p>	<p>8A, 8B, 8C, 8D, 8E, 8F, 8G, 8H</p>	<p><b>Programming a Robot</b> This unit is designed to give students the opportunity to program a robot or automated systems. Students will create a flowchart and write the code to perform an automated operation. Upon culmination of the unit, students will create algorithms that evaluate sensor data and use output commands and variables.</p>
<p>5A, 5B, 5C, 5D, 5E, 5F, 5G, 5H</p>	<p><b>Safety Precautions</b> This unit offers students the opportunity to demonstrate basic technical skills necessary for safety precautions in the STEM field. Students will adhere to and follow all guidelines and regulations to maintain a safe working environment. The culminating activity will have students describe the results of negligent or improper maintenance of tools, equipment, and machines.</p>	<p>9A, 9B, 9C</p>	<p><b>Components Required for Robotic Functions</b> Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions. In this unit, students will demonstrate the workings of a robotic arm. The culminating activity will have students demonstrate the relationship between linkages and gearing as they relate to robotic arm operations.</p>
Second Nine Weeks		Fourth Nine Weeks	
<p><b>TEKS</b> 3A, 3B, 3C, 3D, 3E</p>	<p><b>Teamwork in STEM</b> In this unit students will exhibit team-building skills to accomplish a mission. Students will use positive attitudes to demonstrate effective teamwork and establish team procedures. The culminating activity will be for the students to</p>	<p><b>TEKS</b> 6A, 6B, 6C, 6D</p>	<p><b>Maintain Technological Products, Processes, and Systems</b> Students will use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating</p>

<p>4A, 4B, 4C, 4D</p> <p>11A, 11B, 11C, 11D</p>	<p>work together to solve problems in the field of robotics and complete a competitive and non-competitive goal.</p> <p><b>Project Management</b> In this unit, students will develop a project management plan including initiating, executing, monitoring, controlling, and closing a real or simulated project. The culminating activity will have students develop a Project Management Plan of a real or simulated project.</p> <p><b>Time for Project-Based Learning</b> The Science, Technology, Engineering, and Mathematics (STEM) Career Cluster focuses on planning, managing, and providing scientific research and professional and technical services, including laboratory and testing services, and research and development services. In this unit, students will use tools and laboratory equipment in a safe manner to construct and repair system and use precision measuring instruments to analyze systems and prototypes. The culminating activity for this unit will be for students to use multiple software applications to build upon their activities from Robotics I and simulate robot behavior to present these concepts.</p>	<p>10A, 10B, 10C, 10D, 10E, 10F, 10G, 10H</p> <p>12A, 12B, 12C, 12D, 12E, 12F, 12G</p>	<p>the problem-solving process and the reasonableness of the solution. In this unit, students will troubleshoot and maintain systems and subsystems to ensure safe and proper operation. The culminating activity will include having students implement various sensors in robotic systems.</p> <p><b>Design Methodologies</b> In this unit, students will perform such functions such as applying testing and reiteration strategies to develop or improve a product and applying Six Sigma to analyze the quality of products and how this affects engineering decisions. Students will use an engineering notebook to document the project design process as a legal document.</p> <p><b>Extended Learning Experience</b> This unit will have students design a robotic or automated system. Students are encouraged to expand their learning experiences through avenues such as STEM organizations and other leadership or extracurricular organizations. By connecting with these networks and/or their peers in the previous unit, students will have an audience to present their final project, which may lead to future career opportunities.</p>
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