

Middle School Mechatronics/Robotics

Career Cluster	STEM
Course Code	21016
Prerequisite(s)	None
Credit	.5
Program of Study and Sequence	Foundational Courses, Cluster Courses, Pathway Courses, Capstone Experience
Student Organization	FIRST Lego League and FIRST Tech Challenge
Coordinating Work-Based Learning	tours of local businesses with robotics virtual tours of industrial robots http://highered.mheducation.com/sites/dl/free/0078308291/223250/robot.html
Industry Certifications	None
Dual Credit or Dual Enrollment	None
Teacher Certification	STEM Cluster Endorsement; 7-12 Technology Education Endorsement
Resources	

Course Description:

Middle School Robotics/Mechatronics course allows students to develop an understanding of how robots function, their applications, and how to program them to perform specified tasks.

Program of Study Application

This course is a STEM Cluster course, which may be followed by the STEM Pathway course of Mechatronics/Robotics, followed by a Senior Capstone course.

Course Standards

Indicator # MSMR 1 Understand the components that make up a robot

<i>Webb Level</i>	<i>Sub-indicator</i>	<i>Integrated Content</i>
Two Skill/ Concept	MSMR 1.1. Know the equipment used in robotics <i>Example:</i> <ul style="list-style-type: none"> Identify types of electronic sensors. Explain various functions of motors. Explain the role of a computer as a robotic control device. 	
Two Skill/ Concept	MSMR 1.2. Identify various mechanical systems used in robotics <i>Example:</i> <ul style="list-style-type: none"> Describe a belt and pulley speed reduction system. Recognize the importance and application of mechanical advantages. 	Science
Three Strategic Thinking	MSMR 1.3. Demonstrate the use of programming commands <i>Example:</i> <ul style="list-style-type: none"> Compile a program to demonstrate a robotic “dance.” Develop a program to move a robot along a particular path. 	Computer Coding

Notes:

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Course: Middle School Mechatronics/Robotics

Indicator # MSMR 2 Investigate the impact of robotics on our society

<i>Webb Level</i>	<i>Sub-indicator</i>	<i>Integrated Content</i>
Three Strategic Thinking	MSMR 2.1. Compare and contrast robotics labor vs. human labor <i>Example:</i> <ul style="list-style-type: none">• Explain the economic advantages/disadvantages of robotic labor.• Evaluate the decision of hiring 4 humans vs. 1 robot to do the same job.	Social Science
Two Skill/ Concept	MSMR 2.2. Explore career outlook for robotic applications <i>Example:</i> <ul style="list-style-type: none">• Identify jobs that will be created/eliminated by robotics.• Predict potential robotics related careers.	Career Development
Two Skill/ Concept	MSMR 2.3. Explore new entrepreneurial opportunities using robotics <i>Example:</i> <ul style="list-style-type: none">• Discuss a fictitious business venture utilizing robotic labor.• Identify a business that could be improved using a robotic system.	

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Indicator # MSMR 3 Design a robot to solve a particular problem

<i>Webb Level</i>	<i>Sub-indicator</i>	<i>Integrated Content</i>
Three Strategic Thinking	MSMR 3.1. Identify robotic applications <i>Example:</i> <ul style="list-style-type: none"> In group discussion, consider the application of robotics. Draw a robot. Present the drawings and discuss the various differences in the drawings. 	Soft Skills: communication, team-work, presentation
Four Extended thinking	MSMR 3.2. Propose a robotic design <i>Example:</i> <ul style="list-style-type: none"> Sketch a diagram of a robot that completes a task; e.g. disk jockey, trash collector, welder, transporter, etc. Present an idea to the class of how a robot can make your quality of life better. 	Soft Skills: presentation
Four Extended thinking	MSMR 3.3. Construct a functional robot. <i>Example:</i> <ul style="list-style-type: none"> Build a Lego robot. Use an Erector set to construct a robot. Use a VEX set to construct a robot. 	
Four Extended thinking	MSMR 3.4. Program a robot to perform a specific task. <i>Example:</i> <ul style="list-style-type: none"> Write and upload a program to navigate a robot through a maze. Write a program to make a robot follow a line. 	Computer Coding
Four Extended thinking	MSMR 3.5. Evaluate robot programming <i>Example:</i> <ul style="list-style-type: none"> Record data on the precision of a program that operates a robot. Analyze inconsistencies in the completion of a particular repetitive task performed by a robot. 	

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