



Success Through AI Mastery

STUDENT GUIDE

LESSON 5

Robotics



JA
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Lesson 5:

Robotics

OVERVIEW

In this lesson, you will explore the physical side of AI: Robotics. You will identify different types of robots (Industrial, Service, etc.), learn about the key components of a robot (Sensors, Actuators, Control Systems), and understand how AI acts as the "brain" for the robot's body.



KNOWLEDGE CHECK

Instructions: Place a check mark (✓) next to the correct answer or write your answer in the space provided.

1. An automotive plant in Oshawa, Ontario uses large robotic arms on its assembly line to perform tasks like welding and painting car doors. These robots perform the same precise, repetitive tasks thousands of times a day. What type of robot is this?

- ☐ a) Service Robot
- ☐ b) Specialized Robot
- ☐ c) Autonomous Robot
- ☐ d) Industrial Robot

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2. Match the key component of a robot to its primary function.

- **Control System** matches with: _____
- **Sensors matches** with: _____
- **Actuators matches** with: _____

A. The "muscles" of the robot that create movement (e.g., motors, pistons).

B. The "brain" of the robot that manages its movements and responses.

C. The "senses" of the robot that gather information about the environment (e.g., cameras).

3. A company is designing a robot to navigate a busy warehouse. The robot needs to be able to see obstacles, understand voice commands, and learn paths. Which statement best describes the relationship between AI and this robot?

- ☐ a) Robotics and AI are two separate fields that do not work together in this example.
- ☐ b) AI is the physical body of the robot, and the robotics is the software that controls it.
- ☐ c) The robot is a physical machine, and AI is the software that gives it the intelligence to see, understand, and learn.
- ☐ d) The robot does not require AI; it can perform all tasks with simple programming.

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ACTIVITY: CHOOSE A FORM AND FUNCTION

Design your AI Companion: Step 5

What physical form would your AI companion take?

1. Choose a Form:

Would it be a physical robot that can move around (like a drone or a robot pet)? A stationary smart speaker? Or would it live entirely inside your phone as an app?

2. Justify Your Choice:

Explain how its physical form (or lack thereof) helps it perform its main function better. (e.g., "My AI is a small drone so it can follow me around and use its camera to find my lost keys.")

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LESSON 5 ANSWER KEY

1. d
2. Control System: B, Sensors: C, Actuators: A
3. c



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GLOSSARY

Robotics: The field of science and engineering that deals with the design, construction, operation, and use of physical robots.

Artificial Intelligence (AI): The field of computer science focused on creating systems that can perform tasks that typically require human intelligence, such as learning, reasoning, and problem-solving.

Actuators: The components of a robot that act as its "muscles," responsible for creating movement (e.g., electric motors, hydraulic pistons).

Sensors: The components of a robot that act as its "senses," gathering information about its environment (e.g., cameras, microphones, proximity sensors).

Control System: The "brain" of a robot that processes information from sensors and manages its movements and responses.

Industrial Robot: A type of robot used in manufacturing and industrial settings to perform repetitive tasks like welding, painting, and assembly with high precision.

Deep Learning (DL): A specialized subfield of Machine Learning that uses complex, multi-layered neural networks to learn from vast amounts of data and is especially powerful for tasks like image and speech recognition.

Computer Vision (CV): A field of AI that enables computers to "see" and interpret meaningful information from digital images, videos, and other visual inputs.

Natural Language Processing (NLP): A field of AI focused on enabling computers to understand, interpret, and generate human language, in both text and speech.