



## Certificate of Achievement

# Joshua Wellington

has completed the following course:

**BEGIN ROBOTICS**  
**UNIVERSITY OF READING**

This introductory course explored the usage, history, anatomy, control and behaviour of robots from a cybernetics perspective.

4 weeks, 3 hours per week



**Richard Mitchell**  
Professor of Cybernetics  
University of Reading



The person named on this certificate has completed the activities in the attached transcript. For more information about Certificates of Achievement and the effort required to become eligible, visit [futurelearn.com/proof-of-learning/certificate-of-achievement](https://futurelearn.com/proof-of-learning/certificate-of-achievement).

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#### **STUDY REQUIREMENT**

4 weeks, 3 hours per week

#### **LEARNING OUTCOMES**

- Reflect on the wide variety of robots and their applications.
- Explain how a robot moves, senses and responds to its environment using motors, sensors and actuators.
- Demonstrate the various ways robots are controlled by humans through automation, haptic technologies and virtual reality.
- Compare robot behaviour, cooperation and learning with that of living systems.
- Practise the skills developed on the course through simulations that allow you to experiment, explore and test your knowledge.

#### **SYLLABUS**

##### **Week 1:**

- An introduction to robotics from a cybernetic perspective
- Overview of different types of robots and their application
- History of robotics
- Introduction to the robot simulations used in the course
- Problem solving: commanding a mobile robot to move

##### **Week 2:**

- A description of the components of a robot – sensors, actuators, 'brain' and power supply

- An understanding of different sensors, their operation and application
- A description of motors, and how their velocity is set, and other robotic actuators
- Problem solving: commanding a robot to achieve tasks on the basis of sensor information

##### **Week 3:**

- Feedback for control and human-machine interaction
- An explanation of feedback control of steering and speed in robots and in other applications such as balance, temperature and damping oscillations
- Simple mathematical modelling of robots and different forms of control strategies
- Human-Computer Interaction: feedback, including haptics
- Problem solving: commanding a robot to follow a path

##### **Week 4:**

- Feedback for Learning and robot: robot interaction
- An appreciation of neuron based brains through Braitenberg vehicles
- Robot learning by trial and error
- Multiple robots and artificial life, relating to biological processes
- Problem solving: commanding a robot to traverse a maze