# Basic Electronics

**Basic Electronics with Simulator**

Version 2.22

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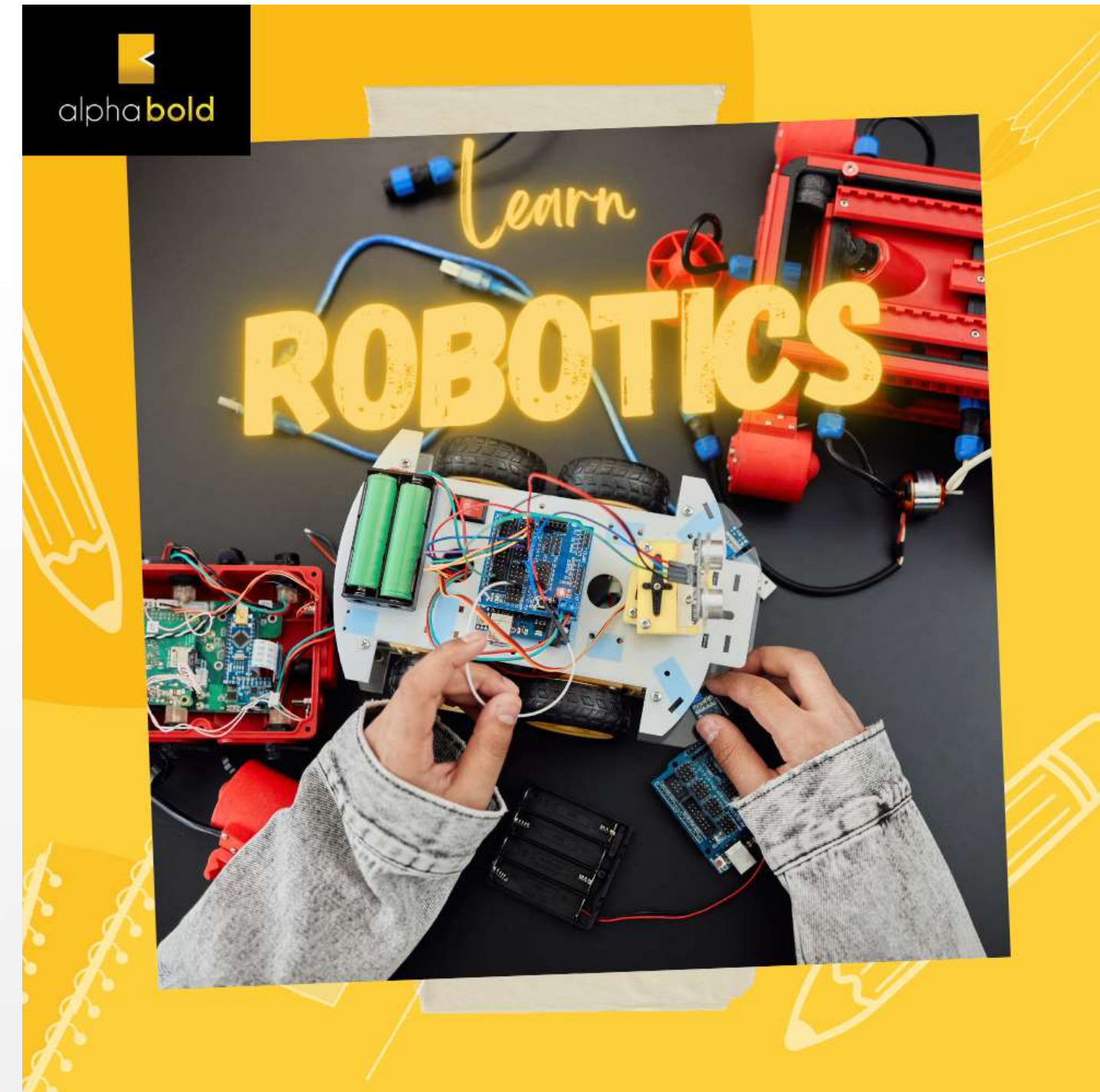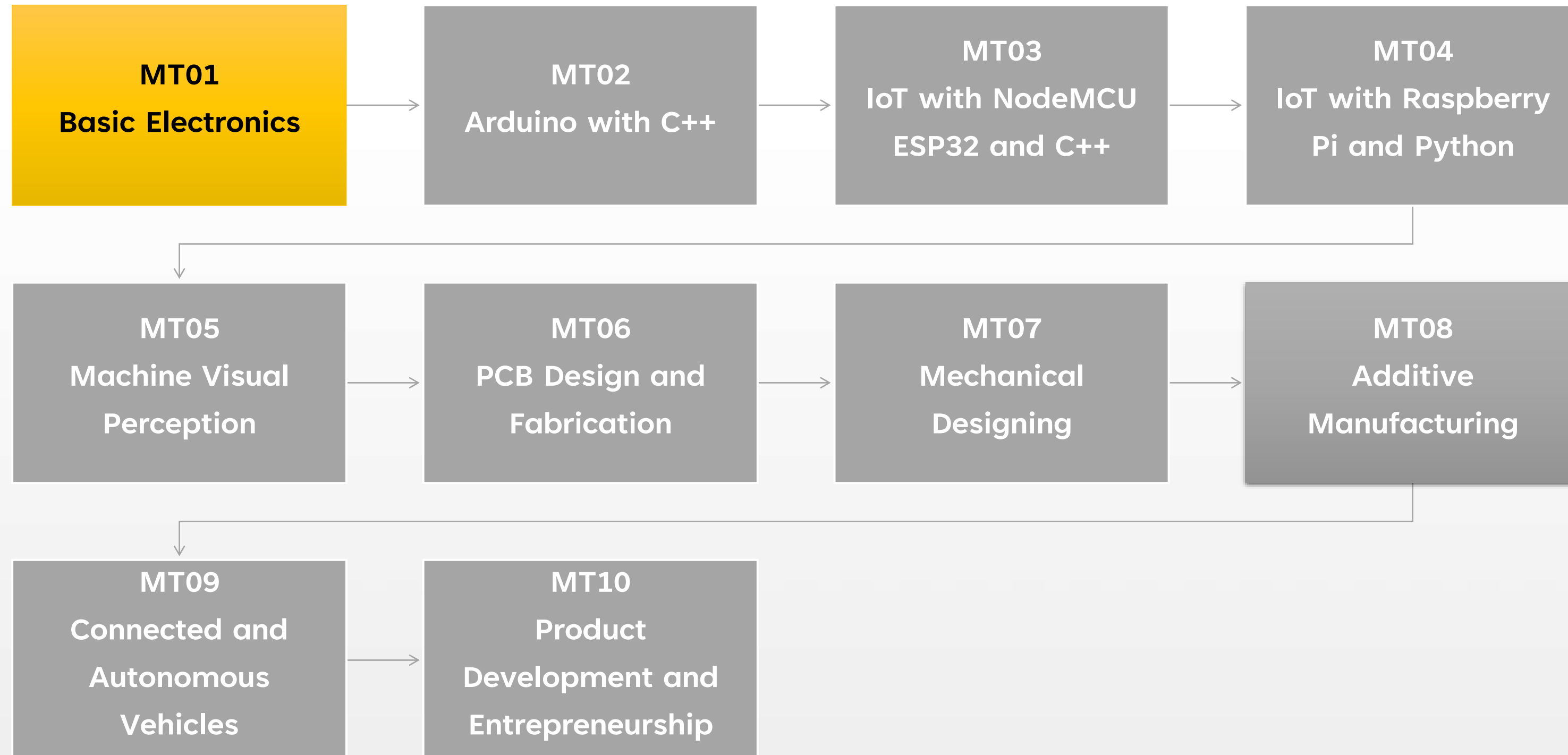
# Course Unit Details

# Overview

This course provides a solid foundation in the fundamentals and principles of analog and digital circuits and electronic devices. It is designed to give students the skills and knowledge necessary for designing new electronic circuits and using them in robotics. The course covers a range of application-oriented topics and includes hands-on Tinkercad simulations to control electronic components, such as sensors and actuators, using microcontrollers like Micro Bit and Arduino.

# Aims

- To introduce students to the basics of robotics and electronics and provide an understanding of the fundamental concepts and principles.

- To teach students how to work with a simulator such as Tinkercad for creating electronic circuits.

- To familiarize students with electronic components, such as resistors, capacitors, and transistors, and their functions in electronic circuits.

- To teach students Ohm's Law and its applications in electronic circuits.

- To introduce students to circuit design and construction, including working with microcontroller boards such as Micro Bit and Arduino.

- To familiarize students with digital and analog outputs and inputs, and how to use them in electronic circuits.

- To teach students how to make AND and OR gates and their applications in electronic circuits.

- To provide students with the skills to debug electronic circuits and troubleshoot any issues that may arise.

- To provide students with hands-on experience by creating practical projects.

- To empower students with the knowledge and skills to design and build their own projects in the field of robotics and electronics.

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# Learning Outcomes

Upon completion of course, students should be able to:

- Understand the basic concepts and principles of robotics and electronics.

- Use Tinkercad to design and simulate electronic circuits.

- Identify and understand the function of various electronic components such as resistors, capacitors, and transistors.

- Apply Ohm's Law to analyze and design electronic circuits.

- Design, construct and program basic electronic circuits using microcontroller boards such as Micro Bit and Arduino.

- Understand and use digital and analog outputs and inputs in electronic circuits.

- Create basic gates such as AND and OR gates and understand their applications in electronic circuits.

- Effectively troubleshoot and debug electronic circuits.

- Design and construct practical projects such as an automatic street light system, a burglar alarm system, and a smart parking system.

- Apply the knowledge and skills acquired in the course to design and build their own projects in the field of robotics and electronics.

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# Syllabus

1. Introduction to Robotics and Electronics

2. Working with Tinkercad

3. Electronic Components

4. Ohm's Law

5. Circuits

6. Working with Micro Bit

7. Working with Arduino

8. Digital and Analog Outputs

9. Digital and Analog Inputs

10. Making AND and OR Gates

11. Debugging

12. Making an Automatic Street Light System

13. Making a Burglar Alarm System

14. Making a Smart Parking System

# Thank you for learning with alpha **bold**