

Course Code: BAS 201

Instructor: Assist. Prof. Dr. Ruaa Ibrahim

Course Name: Electronics

TAssistant: Eng. Manar Hisham

Academic Year: 2024/2025

Cover Page: **DC motor speed control**

Marks	ID	الاسم
	932230126	عمرو ياسر بدر حسين
	932230210	منه الله محمود حلمي جوده
	932230242	يوسف محمود يونس ابو ضيف
	932230230	يوسف السيد محمد سيد

Tasks Electronics Project

Task 1: Choose one of the following projects: 3- DC motor speed control	
Task 2: Design the circuit on the proteus simulation program.	
Task 3: Implement the circuit.	
Task 4: Technical Report	

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Technical Report: **DC motor speed control**

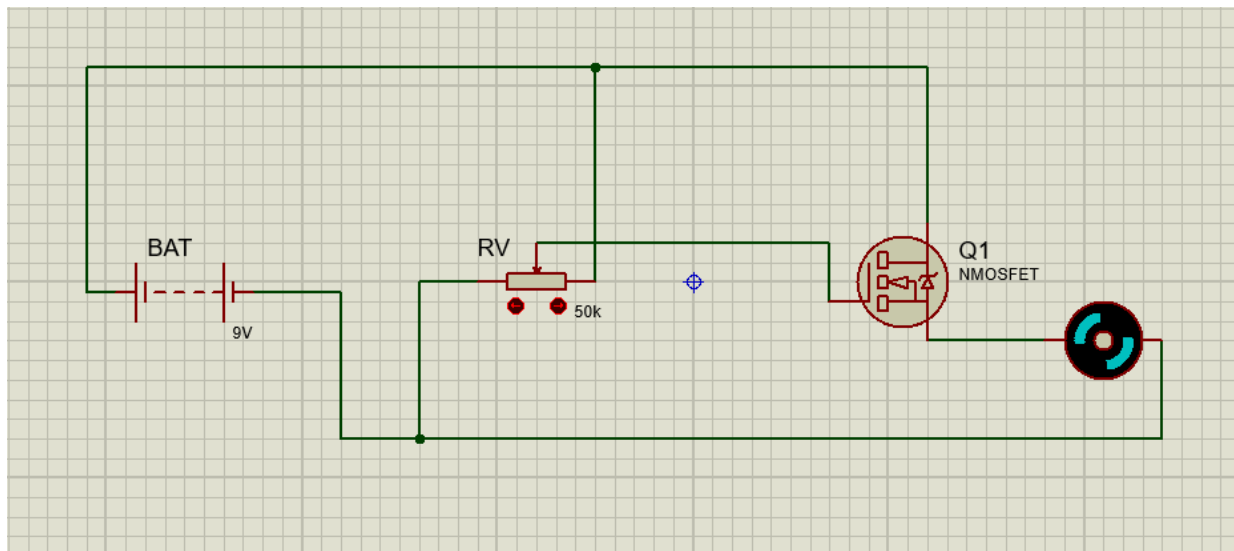
Introduction:-

Controlling the speed of a DC motor is a crucial aspect of modern industrial and household applications. The ability to regulate motor speed allows for energy efficiency, precision, and operational flexibility. This type of control is essential in many everyday devices, such as fans, sewing machines, water pumps, and even mixers. Precise control of motor speed can enhance performance, reduce energy consumption, and provide a more convenient user experience.

This project aims to design a circuit that uses a MOSFET to control speed by varying the voltage or current supplied to the motor. The fundamental premise is that precise speed adjustments can be effectively achieved using an input signal to control the motor's performance.

Experiment Design and Simulation:-

1-screenshot:



2.1-Components Used:

Quantity	Component
1	9V Battery
1	50 kΩ Potentiometer
1	DC Motor
1	nMOS Transistor (MOSFET)

طبقًا للبيانات في الجدول أدناه، فإن المكونات المستخدمة في الدارة هي: بطارية 9 فولت، محرك د.ك.م، ترانزستور MOSFET، ومقاوم متغير 50 كيلو أوم. تم اختيار هذه المكونات بناءً على متطلبات الدارة وتوافرها في السوق.

Quantity	Component	Name in Proteus	Name in Shop
1	9V Battery	Battery	Battery 9V Westinghouse
1	50 kΩ Potentiometer	Pot	Rotary Potentiometer 50Kohm
1	DC Motor	Motor	DC Geared Motor With Wheel For Robot
1	nMOS Transistor (MOSFET)	NMOSFET	IRFZ44N MOSFET N-Channel (55V, 49A)
6	Wires	Wires	Jumper Wire male to male
1	Breadboard	-	Soldless 830 Tie-points

2.2-Functions of the Components:

9V Battery: The main power source for the circuit.

50 kΩ Potentiometer: A tool to control the voltage or current in the circuit by adjusting the resistance, used to regulate the speed of the motor.

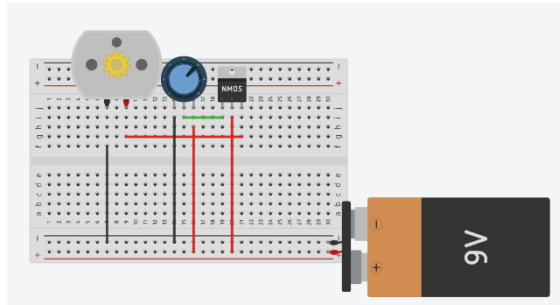
DC Motor: Converts electrical energy into mechanical energy to drive mechanical devices, such as a wheel.

nMOS Transistor (MOSFET): Helps in controlling the variable electrical flow provided by the Potentiometer.

Breadboard and Wires: Connect the electrical components together, forming a complete circuit.

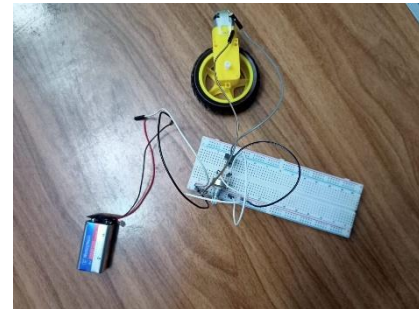
Discussion:-

1-screenshot:



1-Tinkercad

2-Real Live



2.1-Challenges:

There was no issue in finding the components in Proteus, but the problem was that Proteus does not display the components as real hardware pieces.

We needed to be able to control the DC MOTOR speed.

2.2-Solutions:

Using Tinkercad came as a solution to this problem: to visualize the project as if it were implemented in real life. This was very helpful in understanding the final form of the circuit, especially since Tinkercad displays the **motor**, **wires**, and **components** in their realistic form, making the experience more interactive.

we used **mosfet** to control the current and 50K Trimmer to increase or decrease the resistance which lead us to controlling it's speed by Rotating the Trimmer.

Conclusion:-

A **DC motor speed control circuit** was designed and implemented using a **MOSFET** by **varying the voltage supplied to the motor**. The circuit proved effective in achieving precise and efficient speed control.

No significant issues were encountered during the design or operation, thanks to the simplicity and compact size of the circuit. The final results confirmed the circuit's ability to regulate motor speed smoothly and reliably.

This project provides a practical and straightforward solution for motor speed control.
