



Hydroponics is a modern way of growing plants without soil, using water mixed with nutrients. In this system, plant roots are directly exposed to a nutrient-rich water solution. Sciencetech AG08 is based on NFT – Nutrient Film Technique. In NFT, plants are placed in sloping channels where a thin film of water flows continuously. This flow provides nutrients, oxygen, and water directly to the roots. It is highly efficient, clean, and space-saving. We have added two important sensors – EC and pH sensors. The EC sensor measures the concentration of nutrients in water. The pH sensor checks whether the solution is acidic, neutral, or alkaline. Both sensors are crucial because plants only absorb nutrients properly in the right range. If EC or pH levels are not correct, plant growth will be affected. Our system helps to monitor these values in real time. System also has a water pump to circulate nutrients through the NFT channels. A storage tank holds the nutrient solution. The water keeps circulating, so there is very little wastage. Compared to soil farming, this system saves up to 90% water. It is especially useful for urban areas and indoor farming. We have chosen to grow lettuce and mint in our product. These plants grow very well in NFT systems. Students can directly observe how their growth changes with different pH and EC values. This makes the project both scientific and practical. The system is compact, and clean.

Features

NFT (Nutrient Film Technique) Design

- Plants grow in sloping channels with a thin film of nutrient-rich water flowing continuously.
- Ensures roots get nutrients, oxygen, and water efficiently.
- Ideal for lettuce, mint, and other leafy greens.

Real-Time Monitoring with EC & pH Sensors

- Ideal for lettuce, mint, and other leafy greens.
- EC Sensor® Monitors nutrient concentration to avoid under/overfeeding.
- pH Sensor® Maintains the right acidity/alkalinity level for healthy growth.
- Students can observe live data on displays or IoT dashboards.

Automation Ready

- Live Sensor data monitoring on digital display.
- It come with alert system basis of EC and pH sensor.
- Reduces manual checking, making farming smarter and easier.

Grow light Effect

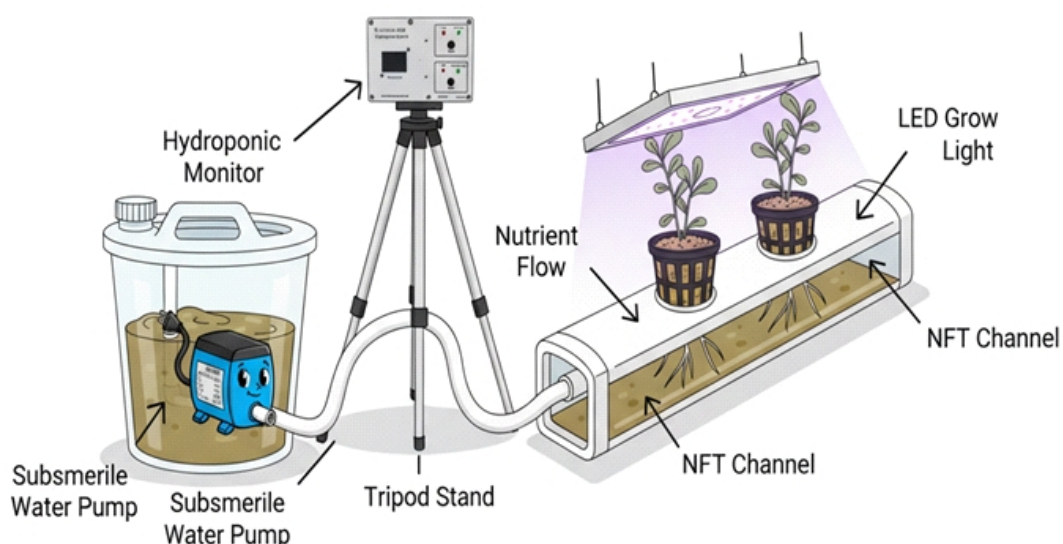
- No dependency on seasonal sunlight.
- Plants receive consistent, controlled light energy.
- Correct spectrum improves leaf development, flowering, and fruiting.

Water & Nutrient Efficiency

- Uses up to 90% less water than soil farming.
- Recirculating system reduces waste of water and nutrients.

Educational Value

- Helps students learn Automation and agriculture together.



Scope of Learning

1. Sensor Integration & Automation Skills.

Learn how EC sensors measure nutrient concentration in water.

Learn how pH sensors detect acidity/alkalinity of nutrient solution.

Data visualization in real time on display.

2. Control Systems.

Understand how sensor readings can automatically adjust nutrients/pH by use of provided alert system.

Build feedback systems for student learning.

Agricultural & Biological Learning

1. Plant Physiology.

How pH affects nutrient absorption.

Role of EC in plant growth and health.

Observe differences in plant growth at different pH/EC levels.

2. Nutrient Management.

Correct nutrient balance for leafy greens vs fruiting plants.

Hands-on experience with preparing and adjusting nutrient solutions.

Practical/Project Learning

1. System Design.

NFT channel design, water circulation, aeration.

Balancing cost, energy, and efficiency in setup.

2. Data-Driven Farming.

Display real-time EC & pH data.

Analyze trends (e.g., nutrients deplete faster as plants mature).

Make farming predictable and efficient.

Broader Scope

Sustainable Agriculture.

Learn water-saving technology.

Explore urban/indoor farming solutions.

Smart farming, Agritech in Agriculture.

Precision farming and controlled environment agriculture.

