



THE HYDROPONIC ACADEMY

ENLIGHTEN YOURSELF WITH THE WISDOM OF PLANTS

HYDROPONICS

COURSE-

SYLLABUS

# CHAPTER 1

## Introduction to Hydroponics Technology

**DURATION: 1 HOUR (0900-10.00)**

**The introduction consists of the following topics:**

- 1. History of Hydroponics**
- 2. What is the hydroponics concept (Culture)?**
- 3. Why hydroponics culture differ from conventional agriculture.**
- 4. Methods used in hydroponics culture.**
- 5. Future of Hydroponics technology.**

## CHAPTER 2

# PLANT PHYSIOLOGY AND REQUIREMENTS.

**DURATION: 5 HOURS**

**(10.00-12.00, 1 hour break, 13.00-14.30, 15minutes break, 14.45-16.15)**

### **THE PLANT PHYSIOLOGY: ( 1 hour)**

1. Plant parts and parts function.
2. How water and nutrients are mobilised.
3. Root-zone.
4. Vegetative and productive stages.
5. Pollination.
6. Flower and fruit.

### **THE PLANT CHEMISTRY and METABOLISM (1 hour)**

1. Photosynthesis.
2. The chemistry of nutrients.
3. Water pH and its implication on plant chemical balance.
4. Plant metabolism.

### **LIGHT (30 minutes)**

- 1. The effect of light on plant development.**
- 2. Light effect on plants (seasons, photoperiods)**

### **NUTRIENTS (90 minutes)**

- 1. Understanding nutrients chemistry.**
- 2. Definition of nutrients.**
- 3. Macro and Micro nutrients roll in plant functioning.**
- 4. Electrical conductivity (EC)**
- 5. pH and its relation to nutrients.**
- 6. Water quality and water toxicity.**
- 7. Nutrients deficiencies- guideline.**

### **TEMPERATURE (30 minutes)**

- 1. Climate and it effect on plants.**
- 2. Understanding temperatures values in relations to season and day/night.**

### **OXYGEN (30 minutes)**

- 1. Why plants need Oxygen.**
- 2. The mechanism of oxygen at plant root zone.**

### **CO<sub>2</sub> (15 minutes).**

- 1. The importance of CO<sub>2</sub> availability to plant development.**
- 2. The CO<sub>2</sub> chemical dynamics in plants photosynthesis.**

**UNDER COVER GROWING (CONTROLLED ENVIRONMENT) (30 minutes)**

1. Climatic conditions in tunnel.
2. The importance of controlling; temperature, humidity and other factors.

**Materials:** Demonstration of light effect on plant (plant sample). Printed information.

**Power point presentation.**

**END OF FIRST DAY**

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# CHAPTER 3

## GROWING MEDIA

**DURATION: 8 hours.**

**(08.30-10.30, 15 minutes break, 10.45-12.00 lunch break, 13.00-16.00, exam)**

**GROWING MEDIA- PROPERTIES. (2 hours)**

**1. CHARACTERISTICS OF GROWING MEDIA ( 1 hour).**

- a. Water holding capacity (WHC)
- b. Porosity.
- c. Sources (Organic vs Non Organic)
- d. Cation exchange capacity.(CEC)

**2. ORGANIC MEDIA ( 30 minutes)**

- a. Coir.
- b. Sawdust (wood shaves)
- c. Pine Bark

**3. NON ORGANIC MEDIA (30 Minutes)**

- a. Perlite.
- b. Vermiculite.
- c. Rock-Wool.
- d. Sand.
- e. Gravel.

**4. WORKING WITH VARIOUS GROWING MEDIA.( 1 hour)**

- a. Consideration of chosen media.**
- b. Choosing the prefer irrigation system due to growing media.**
- c. Preparations of various growing media.**
- d. Maintaining various growing media.**

**END OF DAY TWO.**

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# CHAPTER 4

## HYDROPONICS GROWING SYSTEMS

DURATION: 4 and half hours

(08.30-13.00, Break,14.00-16.30)

### **TROUGH CULTURE: (15 Minutes)**

1. General principles.
2. Advantages and disadvantages.

### **NFT (30 Minutes)**

1. General principles.
2. Advantages and disadvantages.

### **FLOOD AND DRAIN (15 minutes).**

1. General Principles.
2. Advantages and Disadvantages'.

### **PASSIVE HYDROPONICS (15 Minutes)**

1. General Principles.

### **DRIP IRRIGATION ( 45 minutes)**

1. General Principles.
2. Various drip irrigation options.
3. Irrigation strategies.
4. Control and maintenance.

### **AEROPONICS (30 minutes).**

1. General principle.
2. Advantages and disadvantages.

### **AQUAPONICS (30 minutes).**

1. General principle.



2. Advantages' and disadvantages.

### **HYDROPONICS GROWING METHODS ( 1 hour).**

1. Trough culture.
2. Bag Culture.
3. Gutter culture.
4. Container culture.

Materials: Visiting various operating systems. ( 1 hour)

### **IRRIGATION AND NUTRIENTS PROGRAM (2 and half hours)**

1. Structuring Irrigation Strategy.
  - a. Climatic analysis.
  - b. Plant growing stage.
  - c. Consulting parameters (EC & pH)
2. Structuring Nutrients program.
  - a. Nature of crop and specific crop requirements.(Cultivar & Variety)
  - b. Plant growing stage.
  - c. Climatic conditions.

End of day three.

## CHAPTER 5

# CROP PRODUCTION, MARKETING and FINANCIAL CONSIDERATIONS.

( 0900-12.00, break, 13.00-16.00)

### CROP CONTROL & MAINTENANCE ( 1 Hour).

1. Handling plants growing in control environment.
2. Support and trellises.
3. Scouting and observations.
4. IPM- Pest management.
5. Plants nutrients deficiencies symptoms .

### MARKET ANALYSIS ( 3 hour)

1. Parameters to consider that influence crop selection.
  - a. Choosing cultivar/variety.
  - b. Timing.
  - c. Pricing.
  - d. Distance from main target market.
  - e. Packaging.

### MARKET SEGMENT and FINANCIAL CONSIDERATIONS ( 1 hour)

- a. Fresh vegetables.
- b. Leafy crops.
- c. Cut flowers.
- d. Seedlings production.

**Assignment:**

The final day is mainly about producing a business plan which includes all the financial considerations.

Each student focusing on his own “project” and together a general business plan calculation is completed.

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