



Greenhouse Farming and Hydroponics

Course: Controlled-Environment Agriculture for Hot Climates



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Introduction:

Greenhouse farming and hydroponics, as controlled-environment agriculture for hot climates, is a 5-day course for growers, greenhouse operations leads, agri-investors and agricultural authority staff, ending with a Controlled-Environment Farm Design and Business Case for a case site. Protected cropping ventures in arid zones lose money when structures overheat, cooling drains scarce water and nutrient solutions drift, so yields fall short of the investment case. Nominees already run, finance or regulate crop production and work through a modelling build on climate, water, energy and yield data. CoreConcept Training Center delivers this greenhouse farming and hydroponics course.

Course Objectives:

- Assess a hot-climate site, its water source and target crops to decide which level of protected cropping the site can support
- Specify greenhouse structures, covering materials and pad and fan, fogging and shading systems that hold crops within their temperature limits
- Select and run NFT, deep water culture and substrate hydroponic systems with fertigation recipes and EC and pH control
- Set climate control set points, sensor networks and LED lighting regimes for greenhouses and indoor vertical farms
- Build water and energy budgets and an integrated pest management routine for protected crops
- Produce a Controlled-Environment Farm Design and Business Case with crop plan, yield forecast and cost per kilogram for a case site

Target Audience:

- Growers and production managers responsible for greenhouse, net house or indoor crop output and quality
 - Greenhouse operations leads accountable for cooling, irrigation, nutrient dosing and crop protection routines
 - Agri-investors and project developers who appraise and fund controlled-environment farm proposals
 - Agricultural authority staff who review, license or support protected cropping and hydroponic projects
 - Technical managers who plan new greenhouse or vertical farm facilities and their utilities
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Course Outline:

Day 1: Protected Cropping Foundations and Hot-Climate Site Assessment

- Controlled-Environment Agriculture Spectrum From Shade House to Plant Factory
- Crop Physiology Limits Under Heat, Radiation and Low Humidity
- Site Climate Data Review Using Temperature, Radiation and Wind Records
- Water Source Testing for Salinity, Bicarbonate and Boron
- Protected Cropping Current-State Assessment With a Facility Readiness Checklist

Day 2: Greenhouse Structures, Covering Materials and Cooling Technology

- Tunnel, Multi-Span and Gutter-Connected Greenhouse Structure Selection
- Covering Material Choice Among Glass, Polycarbonate and Polyethylene Film
- Evaporative Pad and Fan Cooling Sizing and Airflow Layout
- High-Pressure Fogging, Shade Screens and Natural Ventilation Strategies
- Insect Netting, Double Doors and Structural Wind Load Checks

Day 3: Hydroponic Systems, Fertigation and Nutrient Solution Management

- Nutrient Film Technique Channel Layout and Flow Rate Setting
- Deep Water Culture Raft Systems and Dissolved Oxygen Control
- Substrate Culture With Coconut Coir, Rock Wool and Perlite
- Fertigation Recipe Formulation From Water Analysis and Crop Stage
- EC and pH Monitoring, Drain Analysis and Solution Recirculation

Day 4: Vertical Farming, Climate Control, Resource Budgets and Crop Protection

- Vertical Farming Rack Design With LED Spectrum and Photoperiod Settings
- Climate Computer Set Points for Temperature, Humidity and CO₂
- Sensor Placement, Calibration and Alarm Rules for Growing Rooms
- Water and Energy Budget per Kilogram of Produce
- Integrated Pest Management Scouting With Sticky Traps and Biological Agents

Day 5: Modelling Build for the Controlled-Environment Farm Design and Business Case

- Case Site Brief Review With Climate, Water and Market Data
 - Crop Planning Calendar and Planting Density for Leafy Greens and Tomatoes
 - Yield Forecast and Cost per Kilogram Unit Economics Model
 - Capital and Operating Cost Sensitivity for Cooling and Lighting Choices
 - Controlled-Environment Farm Design and Business Case Completion and Review
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Skills You Will Gain:

- Greenhouse Cooling Design
- Hydroponic System Selection
- Nutrient Solution Management
- Climate Set-Point Tuning
- Water and Energy Budgeting
- Protected Crop Scheduling
- Greenhouse Pest Scouting
- CEA Unit Economics Modelling

Why Attend This Course:

- Deliver a Controlled-Environment Farm Design and Business Case for a case site to the farm owner, investment committee or project review team
- Choose between net house, cooled greenhouse and indoor vertical farm options for a given crop, site and water supply using tested numbers
- Avoid heat-stress crop losses, cooling water overruns and nutrient solution failures that erode yield in the first growing seasons
- Pass fertigation recipes, set-point tables, scouting sheets and the unit economics model to growing and technical teams

Conclusion:

Back at work, the participant hands the farm owner, investment committee or project review team a Controlled-Environment Farm Design and Business Case that fixes the structure, cooling method, hydroponic system, crop plan and cost per kilogram for a site. Decision makers use it to approve, resize or reject a greenhouse or vertical farm proposal, and growers use its set points and fertigation recipes to start production. After the first crop cycle, the unit should compare actual yield, water use and energy use against the model and update the plan.

Frequently Asked Questions FAQ:

What should participants know before a greenhouse farming and hydroponics course?

Participants should already work in crop production, farm investment or agricultural project review and understand basic plant growth needs. Bringing site climate data, a water analysis or a draft greenhouse proposal helps them apply the modelling build to a real case.

How does greenhouse farming and hydroponics differ from a course on field precision farming or organic farming?

It concentrates on enclosed and soilless production: greenhouse structures, cooling, hydroponic systems, nutrient solutions, indoor lighting and the economics of controlled environments. Field sensing, variable-rate machinery and organic soil conversion are covered by other courses and appear here only for comparison.

Why does greenhouse farming and hydroponics in hot climates depend so much on cooling choices?

Cooling decides whether crops stay within temperature limits in summer, and it drives both water and energy use. Pad and fan, fogging and shading each trade water against electricity and capital cost, so the choice shapes yield and cost per kilogram.

What do participants take back from the greenhouse farming and hydroponics course?

Participants take back a Controlled-Environment Farm Design and Business Case for a case site, with a cooling and structure specification, hydroponic layout, fertigation recipe, climate set points, crop calendar, water and energy budget and a unit economics model they can adapt.
