

HYDROPOSHAN ACADEMY PVT. LTD.

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Effective From: 01 July 2026

Syllabus Session 2026-27

Programme details:

Programme name	Professional Certificate in Hydroponic Production & Enterprise Operations
Programme code	HPA-PCHPEO-3M
Duration	90 Days
Batch size	09
Mode	Offline

Programme overview:

The Professional Certificate in Hydroponic Production & Enterprise Operations is a 90-day advanced, competency-based Programme designed to develop technical, operational and managerial competencies required in modern hydroponic and Controlled Environment Agriculture (CEA). Building upon the 30-Day foundation, the programme equips learners with advanced knowledge in protected cultivation, crop planning, smart monitoring, automation, compliance and commercial farm management, preparing them for professional roles in production, farm operations and hydroponic enterprises.

Programme objectives:

1. To develop advanced knowledge of hydroponic production and protected cultivation systems.
2. To strengthen technical decision-making in crop health, crop planning and production management.
3. To develop competency in automation, sensors, environmental monitoring and smart farm operations.
4. To build professional competency in commercial farm management, quality compliance and enterprise operations.
5. To prepare learners for employment, career progression and entrepreneurship in Controlled Environment Agriculture (CEA).

Programme outcomes: On successful completion of the Programme, students will be able to:

PO1	Apply advanced principles of hydroponic production and protected cultivation in commercial farming systems.
PO2	Plan crop production cycles, resource utilization and farm operations for efficient commercial production.
PO3	Interpret environmental, production and monitoring data to support technical and operational decision-making.
PO4	Evaluate crop health strategies, automation systems and compliance requirements for commercial hydroponic production.
PO5	Demonstrate professional competency for employment, farm management or enterprise development in Controlled Environment Agriculture (CEA).

Content of the Programme:

Unit	Name	Topics
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1	Foundations of CEA	Evolution of farming systems, hydroponics introduction, soil vs hydroponics comparison, and applications in controlled environment agriculture.
2	Systems and Growing Media	Hydroponic system types, system selection criteria, growing media types, media properties, and media selection logic.
3	Microgreen & Seed Science	Microgreens production framework, seed biology, substrate science, seed density calculation, and germination physiology.
4	Plant Physiology & Root Health	Root respiration, mold biology, photosynthesis, transpiration, and root physiology in water-based systems.
5	Environmental Engineering	Essential growth parameters, plant lighting science, climate control, and growth-rate determinants.
6	Nutrient & Water Chemistry	Essential nutrients, ion dynamics, and water chemistry for hydroponic production.
7	System Engineering and Crop Protection	System structure, maintenance, root-zone pathology, leaf disorders, and pest management basics.
8	Commercial Crop Science	High-demand crops, crop morphology, yield science, and harvest indicators.
9	Post-Harvest & Food Safety	Post-harvest physiology, handling, storage, hygiene, and packaging hygiene.
10	Farm Operations, Data & Entrepreneurship	Standard Operating Procedures (SOPs), farm operations, production records, data analytics, farm economics, inventory management, packaging, entrepreneurship, business management, and career development.
11	Protected Cultivation Systems	Site selection, protected cultivation structures, environmental control, irrigation and fertigation, climate management, and basic automation.
12	Advanced IPM and Nutrient Strategy	Integrated crop protection, nutrient diagnosis, corrective fertigation, and crop health management.
13	Crop Planning and Farm Simulation	Crop planning, production scheduling, resource management, yield forecasting and farm simulation.
14	Automation, Smart Monitoring & Digital Agriculture	Automation systems, environmental sensing, smart monitoring, data interpretation, and digital agriculture technologies.
15	Farm Business & Compliance at Scale	Quality standards (GAP & GlobalG.A.P.), regulatory compliance, workforce management, occupational safety, and government support schemes.
16	Career & Placement Readiness	Career preparation, technical interviews, professional communication, professional portfolio development, commercial farm case studies, and industry interaction.

Unit Details

Unit 1: Foundations of CEA

Terminal Outcomes

- Explain the concept and significance of Controlled Environment Agriculture (CEA).
- Compare conventional farming with hydroponic cultivation.
- Identify major applications and opportunities in hydroponics and Controlled Environment Agriculture (CEA).

Theory – Key Learning Outcomes

- Explain the evolution of agricultural production systems and the need for Controlled Environment Agriculture (CEA).
- Define hydroponics and describe its principles.
- Differentiate between soil-based cultivation and hydroponic production systems.
- Explain the advantages and limitations of hydroponic farming.
- Identify different applications of hydroponics in commercial, urban and protected agriculture.
- Describe the role of hydroponics in food security, water conservation and sustainable agriculture.
- Explain the scope of hydroponic farming, CEA and emerging career opportunities.

Unit 2: Systems and Growing Media

Terminal Outcomes

- Explain different hydroponic production systems and growing media used in Controlled Environment Agriculture.
- Select suitable hydroponic systems and growing media based on crop and production requirements.
- Demonstrate the preparation and commissioning of hydroponic production systems for crop establishment.

Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
• Explain the working principles of major hydroponic production systems. • Describe the major components and their functions in hydroponic production systems. • Differentiate between media-based and media-less hydroponic production systems. • Compare Wick, Kratky, DWC, NFT, DFT, Drip, Ebb & Flow, Vertical Tower and other systems. • Select appropriate hydroponic systems based on crop type, production scale and commercial application. • Describe the characteristics and functions of growing media used in hydroponic cultivation. • Compare the physical and chemical properties of Cocopeat, Perlite, Vermiculite, Rockwool and LECA. • Select suitable growing media for different hydroponic crops. • Explain growing media preparation, sterilization and reuse practices. • Explain the importance of root-zone aeration, moisture retention and drainage.	• Identify and compare different hydroponic production systems available at the training centre. • Identify the major components of different hydroponic production systems available at the training centre. • Assemble, disassemble and inspect hydroponic production system components safely. • Prepare, hydrate and condition different growing media before use. • Fill nursery trays and net pots using recommended growing media. • Transplant seedlings into appropriate hydroponic production systems using recommended cultivation practices. • Prepare and fill microgreen trays using appropriate growing media and recommended production practices. • Inspect reservoirs, pumps, pipelines, distribution lines, cultivation units and irrigation components for proper operation. • Demonstrate cleaning, sterilization and preventive maintenance of hydroponic production systems. • Perform routine inspection of hydroponic system components before crop establishment. • Verify system functionality before initiating crop production. • Record system inspection and maintenance activities in the Hydroponic Production Log Book.

Unit 3: Microgreen & Seed Science

Terminal Outcomes

- Explain the scientific principles of seed biology and commercial microgreen production.
- Demonstrate scientific seed handling, sowing and germination techniques for microgreen cultivation.
- Produce high-quality microgreens by following standard production practices.

Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
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• Explain the concept, characteristics and commercial importance of microgreens. • Differentiate between sprouts, microgreens, baby leaf vegetables and mature leafy vegetables. • Describe the morphology and structure of a seed. • Explain seed dormancy, viability and vigour. • Explain the factors affecting seed germination. • Describe the physiological stages of seed germination. • Explain the influence of temperature, moisture, oxygen and light on seed germination. • Describe the criteria for selecting seeds for commercial microgreen production. • Explain the properties and selection of growing media used for commercial microgreen cultivation. • Explain the effect of seed density on germination, crop uniformity and yield. • Explain blackout management and its role in commercial microgreen production. • Describe irrigation and moisture management during different stages of microgreen cultivation.	• Identify seeds suitable for commercial microgreen production. • Evaluate seed quality through visual inspection and physical characteristics. • Calculate seed quantity based on tray dimensions and recommended seed density. • Prepare and level growing media for uniform seed sowing. • Sow seeds uniformly using recommended commercial practices. • Demonstrate proper irrigation and moisture management during germination. • Implement blackout management using appropriate covering materials. • Monitor germination percentage, seedling emergence and crop uniformity. • Remove blackout covers at the appropriate growth stage. • Maintain hygiene and sanitation throughout the production cycle. • Harvest microgreens using recommended harvesting practices. • Record germination, production observations, yield and harvest data in the Microgreen Production Log Book. • Clean, sanitize and prepare trays and equipment for subsequent production cycles.
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Unit 4: Plant Physiology & Root Health

Terminal Outcomes

- Explain the physiological processes governing plant growth in hydroponic systems.
- Evaluate root health and plant performance based on physiological characteristics.
- Identify physiological disorders affecting hydroponically grown crops.

Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
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• Explain the structure and functions of roots in hydroponically grown crops. • Describe the process of root respiration and its role in water and nutrient absorption. • Explain the principles of photosynthesis and its contribution to plant growth. • Describe the process of transpiration and its role in plant water movement. • Explain the translocation of water, minerals and photosynthates within plants. • Describe the relationship between root-zone oxygen availability and root development. • Explain the factors influencing root growth and architecture in hydroponic systems. • Describe the causes and symptoms of common root-zone disorders. • Explain the occurrence and development of moulds affecting seedlings and root systems. • Describe the physiological disorders affecting hydroponic crop growth. • Explain the relationship between plant physiological processes and crop growth, development and productivity.	• Observe and distinguish healthy and unhealthy root systems in hydroponically grown crops. • Examine root colour, structure, branching and vigour to assess root health. • Identify symptoms of root stress, oxygen deficiency and root-zone disorders. • Observe physiological abnormalities affecting plant growth and development. • Compare root growth and development at different crop growth stages. • Measure and record plant growth parameters, including plant height, leaf number and canopy development. • Assess crop vigour through visual plant health evaluation. • Identify mould development affecting seedlings and root systems. • Demonstrate root-zone hygiene practices to promote healthy crop growth. • Record root health observations and plant growth parameters in the Hydroponic Production Log Book.
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Unit 5: Environmental Engineering

Terminal Outcomes

- Explain the role of environmental parameters in the production of hydroponically grown crops.
- Monitor and interpret environmental conditions within a Controlled Environment Agriculture (CEA) facility.
- Operate environmental control systems to maintain optimum crop growth conditions.

Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
• Explain the concept of plant microclimate in Controlled Environment Agriculture. • Describe the effect of air temperature on crop growth and development. • Explain the influence of relative humidity on plant performance. • Describe the concept and significance of Vapour Pressure Deficit (VPD) in Controlled Environment Agriculture. • Explain the principles of light intensity, light quality, photoperiod and Daily Light Integral (DLI). • Describe the role of carbon dioxide (CO₂) in plant productivity. • Explain the role of air movement and ventilation in maintaining optimum crop growing conditions. • Describe environmental control methods used to regulate temperature and humidity in Controlled Environment Agriculture. • Explain environmental monitoring instruments and their applications. • Interpret environmental data for effective crop management and production decision-making.	• Measure and record air temperature and relative humidity using environmental monitoring instruments. • Measure and record PPFD at crop canopy level. • Monitor and interpret VPD using environmental data. • Monitor and record photoperiod and lighting schedules. • Operate environmental control systems available at the training centre. • Monitor airflow and ventilation within hydroponic production areas. • Assess the influence of environmental conditions on hydroponically grown crops. • Record daily environmental observations in the Hydroponic Production Log Book. • Compare recorded environmental conditions with recommended crop-specific production parameters. • Verify the accuracy and proper operation of environmental monitoring instruments before use. • Prepare a basic environmental monitoring report using observations recorded during the crop production cycle.

Unit 6: Nutrient & Water Chemistry

Terminal Outcomes

- Explain the principles of plant nutrition and water chemistry in hydroponic systems.
- Prepare and manage nutrient solutions for hydroponically grown crops.
- Monitor and maintain nutrient solution quality to ensure optimum plant growth.

Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
• Explain the essential macro and micronutrients required for hydroponic crop production. • Describe the functions, mobility and deficiency symptoms of essential plant nutrients. • Explain the principles of nutrient solution chemistry and nutrient availability. • Describe the importance of water quality in hydroponic nutrient management. • Explain the significance of pH, EC, TDS and alkalinity in nutrient management. • Describe the influence of water quality parameters on nutrient uptake and crop performance. • Explain the preparation and storage of stock nutrient solutions. • Describe nutrient solution mixing procedures and dilution principles. • Explain nutrient solution monitoring, replenishment and replacement practices. • Describe common nutrient imbalances and corrective measures in hydroponic systems.	• Collect water samples for quality assessment. • Measure and record pH, EC and TDS using digital instruments. • Interpret water quality test results for hydroponic nutrient preparation. • Determine the suitability of available water sources for hydroponic nutrient preparation based on measured water quality parameters. • Prepare stock nutrient solutions following recommended formulations. • Prepare working nutrient solutions for hydroponic production systems. • Calculate and adjust nutrient concentrations according to crop requirements. • Adjust nutrient solution pH using appropriate corrective agents. • Replenish and replace nutrient solutions in hydroponic nutrient reservoirs. • Monitor nutrient solution quality throughout the production cycle. • Calibrate pH, EC and TDS meters before use. • Clean, maintain and store nutrient preparation equipment and measuring instruments. • Record nutrient preparation, monitoring and adjustment activities in the Hydroponic Production Log Book.

Unit 7: System Engineering & Crop Protection

Terminal Outcomes

- Operate and maintain hydroponic production systems for efficient crop cultivation.
- Identify system faults and perform routine troubleshooting and preventive maintenance.
- Implement crop protection strategies to maintain healthy hydroponic production systems.

Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
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• Explain the engineering principles of water circulation and irrigation in hydroponic systems. • Describe the operation and functions of pumps, pipelines, valves, filters and irrigation accessories. • Explain preventive maintenance practices for hydroponic production systems. • Describe common mechanical and operational failures in hydroponic systems and their corrective measures. • Explain sanitation, hygiene and biosecurity protocols. • Describe the principles of Integrated Pest Management (IPM) in Controlled Environment Agriculture. • Identify major insect pests, diseases and physiological disorders affecting hydroponically grown crops. • Explain pest and disease monitoring techniques for early detection. • Describe biological, physical and chemical crop protection methods. • Explain the safe handling, storage and responsible use of crop protection products.	• Inspect pumps, pipelines, valves, reservoirs and irrigation components for proper operation. • Perform routine cleaning and preventive maintenance of hydroponic production systems. • Identify and rectify common operational faults in hydroponic production systems. • Flush and sanitize irrigation systems, production equipment and cultivation containers. • Inspect crops for signs of insect pests, diseases and physiological disorders. • Monitor insect pests and disease incidence using routine crop scouting techniques. • Demonstrate the safe preparation and application procedures for approved crop protection products. • Maintain hygiene and sanitation in hydroponic and microgreen production areas. • Dispose of infected plant material following recommended safety procedures. • Record maintenance activities, system observations and crop protection measures in the Hydroponic Production Log Book.
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Unit 8: Commercial Crop Science

Terminal Outcomes

- Identify commercially important hydroponic crops and their production requirements.
- Plan and manage crop production from transplanting to harvest.
- Evaluate crop performance based on commercial production standards.

Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
• Classify hydroponic crops based on growth habit and commercial application. • Describe the production requirements of leafy vegetables, herbs, fruiting vegetables and microgreens. • Explain crop selection based on climate, production system and market demand. • Describe the growth and development stages of commercially important hydroponic crops. • Explain crop spacing, planting density and canopy management principles. • Describe crop scheduling for continuous commercial production. • Explain crop maturity indices for commercially important hydroponic crops. • Describe factors affecting crop quality, uniformity and marketability. • Explain crop yield estimation and production efficiency. • Describe production planning for year-round hydroponic cultivation.	• Identify commercially important hydroponic crops cultivated at the training centre. • Classify hydroponic crops based on their growth habit and commercial application. • Compare crop production requirements for leafy vegetables, herbs, fruiting vegetables and microgreens. • Select appropriate hydroponic production systems for different crops. • Identify crop growth stages in commercially grown hydroponic crops. • Assess crop spacing, planting density and canopy development under commercial production conditions. • Determine crop maturity using recommended maturity indices. • Estimate crop yield using crop observations and production records. • Evaluate crop quality and marketability based on commercial standards. • Prepare a basic crop production plan for continuous hydroponic cultivation.

Unit 9: Post-Harvest & Food Safety

Terminal Outcomes

- Apply post-harvest handling practices to maintain the quality and shelf life of hydroponic produce.
- Implement food safety, hygiene and traceability practices during post-harvest operations.
- Prepare hydroponic produce for storage, transportation and marketing.

Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
• Explain the objectives and importance of post-harvest management in hydroponic crop production. • Describe physiological changes occurring in fresh produce after harvest. • Explain the factors affecting post-harvest quality and shelf life of leafy vegetables, herbs and microgreens. • Describe the post-harvest handling chain from harvest to consumer. • Explain grading standards and quality parameters for hydroponic produce. • Describe cleaning, washing and sanitization practices for fresh produce. • Explain packaging materials and packaging methods for hydroponically grown produce. • Describe storage and cold chain requirements for maintaining produce quality. • Explain the principles of food safety, personal hygiene and contamination prevention. • Describe traceability requirements and quality assurance practices in fresh produce supply chains.	• Harvest hydroponically grown produce using hygienic harvesting practices. • Handle harvested produce to minimize mechanical damage and quality loss. • Sort and grade produce according to commercial quality standards. • Clean and sanitize harvested produce using recommended procedures. • Select appropriate packaging materials for different hydroponically grown produce. • Pack and label produce according to basic traceability and marketing requirements. • Store harvested produce under recommended environmental conditions. • Maintain hygiene and sanitation in the post-harvest work area. • Follow food safety protocols during harvesting, handling and packaging operations. • Record post-harvest operations, grading results and packaging details in the Hydroponic Production Log Book and Microgreen Production Log Book, as applicable.

Unit 10: Farm Operations, Data & Entrepreneurship

Terminal Outcomes

- Apply Standard Operating Procedures (SOPs) for commercial hydroponic farm operations.
- Maintain production records and interpret farm data for operational decision-making.
- Demonstrate basic entrepreneurship and professional skills required for employment in the hydroponics industry.

Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
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• Explain the importance of Standard Operating Procedures (SOPs) in commercial hydroponic production. • Describe routine operational activities performed in commercial hydroponic farms. • Explain the purpose and importance of production records and farm documentation. • Describe the use of production data for crop monitoring and operational decision-making. • Explain basic production costing and resource utilization in hydroponic farming. • Describe inventory and consumable management practices in commercial hydroponic farms. • Explain the fundamentals of hydroponic entrepreneurship and business opportunities. • Describe workplace ethics, communication skills and professional behaviour expected in the hydroponics industry. • Explain career opportunities, job roles and skill requirements in Controlled Environment Agriculture. • Describe interview preparation, resume writing and professional career development.	• Follow Standard Operating Procedures during routine farm operations. • Maintain Hydroponic Production Log Book and Microgreen Production Log Book accurately. • Compile and interpret production data collected during the crop cycle. • Prepare basic production reports using crop performance and operational records. • Estimate input consumption and basic production costs for a crop cycle. • Maintain inventory records for seeds, growing media, nutrients and consumables. • Demonstrate effective teamwork and communication during routine farm operations. • Demonstrate proper workplace documentation and reporting practices. • Interpret production records to support operational decision-making. • Prepare and present a comprehensive crop production report based on observations, production records and practical activities completed during the programme.
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Unit 11: Protected Cultivation Systems

Terminal Outcomes

- Explain the principles and applications of protected cultivation systems used in commercial agriculture.
- Select appropriate protected structures and environmental control strategies based on crop and production requirements.
- Operate and manage protected cultivation systems for efficient crop production.

Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
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• Explain the concept and importance of protected cultivation in modern agriculture. • Differentiate between polyhouse, greenhouse, net house, shade house and other protected structures. • Explain the criteria for site selection for protected cultivation based on climate, topography, accessibility, water availability, power supply and market access. • Classify protected cultivation structures based on design, covering materials and environmental control. • Explain the principles of natural and forced ventilation in protected cultivation. • Describe shading, cooling and humidity management methods used in protected structures. • Explain the principles of drip irrigation and fertigation in protected cultivation. • Describe environmental factors affecting crop performance inside protected structures. • Explain the integration of hydroponic production systems within protected cultivation. • Describe the role of basic automation in protected cultivation systems. • Explain the transition from soil-based cultivation to soilless cultivation under protected environments.	• Evaluate and select suitable sites for protected cultivation using standard site selection criteria. • Explain the principles of protected structure orientation and layout planning for optimum light interception, ventilation and operational efficiency. • Identify different types of protected cultivation structures through demonstrations, models or industry visits. • Evaluate the suitability of protected structures for different crops and production systems. • Identify the major functional components of a commercial protected cultivation system. • Demonstrate the operation of ventilation, shading, cooling and irrigation systems used in protected cultivation. • Monitor environmental conditions inside protected cultivation systems using appropriate instruments. • Interpret environmental observations to support crop management decisions. • Inspect protected cultivation systems for routine operational and maintenance requirements. • Evaluate crop suitability for different protected cultivation environments. • Analyse commercial protected cultivation layouts and production workflows through case studies. • Record observations and recommendations related to protected cultivation management.
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Unit 12: Advanced IPM and Nutrient Strategy

Terminal Outcomes

- Develop integrated crop protection and nutrient management strategies for commercial hydroponic production.
- Diagnose crop health problems and recommend appropriate corrective measures.
- Evaluate nutrient and crop protection practices to improve crop productivity and quality.

Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
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• Explain the principles of Integrated Pest Management (IPM) in commercial hydroponic production. • Describe the interaction between plant nutrition, environmental conditions and crop health. • Explain nutrient interactions and their influence on nutrient availability and crop performance. • Describe the causes and symptoms of nutrient deficiencies, toxicities and nutrient antagonism. • Explain methods for diagnosing nutrient-related and crop health disorders. • Describe biological, cultural, physical and chemical strategies for integrated crop protection. • Explain pesticide resistance management and resistance rotation strategies. • Describe the principles of corrective fertigation planning for different crop growth stages. • Explain decision-making approaches for nutrient correction and crop protection based on production observations. • Describe integrated crop health management strategies for sustainable hydroponic production.	• Diagnose crop health problems using plant observations and production records. • Differentiate nutrient deficiencies, physiological disorders, insect damage and disease symptoms using case studies and crop samples. • Evaluate nutrient solution data and recommend corrective nutrient management strategies. • Develop corrective fertigation plans for different crop growth stages. • Analyse pest monitoring records and recommend appropriate Integrated Pest Management (IPM) strategies. • Select suitable biological, cultural, physical or chemical control measures based on production scenarios. • Interpret crop health trends using production records and environmental observations. • Prepare integrated crop health management plans for commercial hydroponic production. • Evaluate the effectiveness of implemented nutrient and crop protection strategies. • Document crop diagnosis, corrective actions and follow-up recommendations using technical records.
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Unit 13: Crop Planning and Farm Simulation

Terminal Outcomes

- Develop crop production plans for commercial hydroponic farming based on technical and market requirements.
- Prepare production schedules and resource plans for continuous crop production.
- Evaluate farm performance using production planning and simulation techniques.

Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
• Explain the principles of crop planning in commercial hydroponic production. • Describe crop calendars for leafy vegetables, herbs, fruiting vegetables and microgreens. • Explain staggered production planning for continuous harvesting and market supply. • Describe crop spacing, plant population and production capacity planning. • Explain resource planning for seeds, growing media, nutrients, water and labour. • Describe production scheduling for nursery establishment, transplanting, crop maintenance and harvesting. • Explain the principles of yield forecasting and production estimation. • Describe batch tracking and production record management. • Explain production planning based on market demand and seasonal variations. • Describe farm simulation techniques for evaluating production efficiency and profitability.	• Prepare crop calendars for different hydroponic crops. • Develop staggered production schedules for continuous crop harvesting. • Calculate plant population and production capacity for different hydroponic production systems. • Estimate resource requirements, including seeds, growing media, nutrients and water, for planned crop cycles. • Prepare nursery, transplanting and harvesting schedules for commercial production. • Forecast crop yield using production records and crop growth data. • Analyse batch-wise production records to evaluate farm performance. • Develop production plans based on simulated market demand and production constraints. • Evaluate alternative production scenarios using farm simulation exercises. • Present a commercial crop production plan for a hydroponic farming enterprise.

Unit 14: Automation, Smart Monitoring & Digital Agriculture

Terminal Outcomes

- Explain the principles and applications of automation and smart monitoring in commercial hydroponic production.
- Operate and interpret data from sensors and automated environmental control systems.
- Evaluate automation strategies to improve production efficiency, resource utilization and crop performance.

Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
• Explain the role of automation in modern hydroponic and Controlled Environment Agriculture (CEA) systems. • Describe different levels of automation used in commercial hydroponic production. • Explain the working principles and applications of environmental, water quality and nutrient monitoring sensors. • Describe automated irrigation, fertigation and environmental control systems. • Explain the principles of Internet of Things (IoT) and remote monitoring in smart farming. • Describe data acquisition, monitoring and basic data visualization for farm management. • Explain alarm systems and decision support tools used in automated hydroponic production. • Describe the applications of artificial intelligence (AI) and data analytics in precision hydroponic farming. • Explain the benefits, limitations and economic considerations of automation in commercial hydroponic production. • Describe future trends in automation and smart farming technologies.	• Identify sensors and automation devices commonly used in commercial hydroponic production. • Demonstrate the operation and applications of environmental and nutrient monitoring instruments. • Monitor and interpret sensor data for crop management and operational decision-making. • Evaluate the performance of automated irrigation, fertigation and environmental control systems through demonstrations or case studies. • Configure basic monitoring parameters for hydroponic crop production. • Analyse environmental and production data collected from smart monitoring systems. • Evaluate automation solutions for different hydroponic production systems based on technical and economic considerations. • Develop a basic automation plan for a commercial hydroponic production facility. • Interpret smart farming case studies to recommend operational improvements. • Prepare a technical report on automation and smart monitoring applications in hydroponic production.

Unit 15: Farm Business & Compliance at Scale

Terminal Outcomes

- Explain quality standards, regulatory requirements and compliance practices applicable to commercial hydroponic production.
- Apply farm management principles for workforce coordination, operational safety and quality assurance.
- Evaluate government support schemes and compliance frameworks to strengthen commercial hydroponic enterprises.

Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
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• Explain the principles and importance of Good Agricultural Practices (GAP) in commercial hydroponic production. • Describe the objectives and requirements of Global GAP certification and its relevance to commercial farming. • Explain farm documentation, traceability and record management for quality assurance and compliance. • Describe food safety, worker hygiene and biosecurity practices in commercial hydroponic farms. • Explain labour planning, workforce supervision and team management principles. • Describe occupational health, safety protocols and emergency response procedures in hydroponic production facilities. • Explain government policies, subsidy schemes and institutional support available for Controlled Environment Agriculture (CEA). • Describe legal, environmental and regulatory considerations applicable to commercial hydroponic enterprises. • Explain audit preparedness and compliance monitoring in commercial farm operations. • Describe sustainable farm management practices for long-term commercial success.	• Assess farm operations against basic GAP principles using a compliance checklist. • Evaluate commercial farm documentation for traceability and quality assurance. • Prepare standard operating checklists for hygiene, sanitation and food safety. • Develop workforce allocation and task schedules for commercial hydroponic operations. • Demonstrate safe working practices and emergency response procedures in hydroponic facilities. • Analyse commercial farm case studies to identify compliance gaps and recommend corrective actions. • Evaluate eligibility requirements and application processes for relevant government support schemes. • Conduct a basic compliance audit simulation using farm records and operational checklists. • Prepare a compliance improvement plan for a commercial hydroponic farm. • Present recommendations for improving quality, safety and operational compliance in a hydroponic enterprise.
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Unit 16: Career & Placement Readiness

Terminal Outcomes

- Prepare professional documents and demonstrate employability skills for careers in hydroponics and Controlled Environment Agriculture (CEA).
- Analyse commercial hydroponic operations and recommend technical and operational improvements.
- Demonstrate technical competency, communication skills and professional conduct through placement-oriented assessments.

Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
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• Explain career opportunities and job roles in hydroponics and Controlled Environment Agriculture (CEA). • Describe the recruitment process, employer expectations and workplace ethics in the hydroponics industry. • Explain the principles of professional resume writing and job application preparation. • Describe effective communication, teamwork and problem-solving skills required in commercial farm operations. • Explain interview preparation techniques for technical and supervisory roles. • Describe methods for analysing commercial farm operations using technical and operational data. • Explain professional networking, continuous learning and career development strategies. • Describe entrepreneurship pathways and self-employment opportunities in hydroponics. • Explain the importance of industry interaction, expert guidance and lifelong professional development. • Describe professional standards and responsibilities expected in commercial hydroponic production.	• Prepare a professional resume and job application for hydroponic and CEA-related positions. • Participate in mock technical interviews and demonstrate effective interview skills. • Analyse commercial hydroponic farm case studies and recommend technical and operational improvements. • Deliver technical presentations on hydroponic production, farm management or commercial case studies. • Demonstrate workplace communication, teamwork and professional behaviour through simulated industry activities. • Prepare and present a comprehensive farm performance review using production, environmental and operational data. • Interact with industry experts and document key technical and professional learnings. • Develop a personal career development plan aligned with individual career goals. • Complete a comprehensive capstone assessment integrating technical, operational and managerial competencies acquired during the Programme. • Present a professional portfolio comprising production records, reports, projects and competency-based assignments completed during the Programme. • Participate in technical group discussions and professional communication exercises related to commercial hydroponic production.
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Fee Structure

Category	Fee
Programme Fee (Without Accommodation)	■49,999 per student
Registration Fee	■1000 (Registration fee is non-refundable but adjustable against total course fee.)

Eligibility

Criteria	Requirement
Minimum Qualification	10th pass or equivalent
Age	18 years and above
Who Can Apply	Students, entrepreneurs, job seekers
Background Required	Basic knowledge of biology or agriculture is desirable but not mandatory.
Commitment	Full-time 3-month commitment required
Language Ability	Basic understanding of Hindi or English

Assessment Criteria

Assessment Component	Description	Weightage
Theory Examination	Evaluation of conceptual knowledge through written examination (MCQs, short and descriptive questions).	25%

Practical Assessment	Evaluation of technical skills through laboratory exercises, crop production activities and equipment handling.	35%
Production Log Books	Assessment of Hydroponic Production Log Book and Microgreen Production Log Book based on completeness, accuracy and observations.	15%
Viva-Voce	Assessment of technical understanding, problem-solving ability and practical knowledge.	10%
Project / Assignment	Evaluation of production records, case studies, crop reports or business-related assignments, as applicable.	10%
Professional Conduct & Attendance	Assessment of attendance, punctuality, teamwork, discipline, laboratory safety and professional behaviour.	5%
Total		100%

Minimum Qualifying Criteria

- Minimum 85% attendance to appear for the final assessment.
- Minimum 40% marks in Theory Examination.
- Minimum 40% marks in Practical Assessment.
- Minimum 40% aggregate marks to successfully complete the Programme.

Grading System

Percentage	Grade	Performance
90–100	A+	Outstanding
80–89	A	Excellent
70–79	B+	Very Good
60–69	B	Good
50–59	C+	Above Average
40–49	C	Average
Below 40	F	Not Qualified