Training Course on Advanced Irrigation System Design, Installation, and Maintenance

Professional Development Training Course Outline

Category	Agriculture	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Efficient water management is critical in modern agriculture, landscaping, and urban green infrastructure. Training Course on Advanced Irrigation System Design, Installation, and Maintenance is designed to equip professionals with practical and advanced knowledge in water-efficient irrigation technologies, precision irrigation systems, and sustainable landscape solutions. With climate change and water scarcity rising, mastering irrigation system innovations is essential for increasing crop yield, saving water, and reducing environmental impact.

This course offers a deep dive into automated irrigation design, smart irrigation technologies, drip and sprinkler systems, pressure regulation, filtration, and fertigation techniques. Participants will learn through real-world case studies, interactive modules, and practical demonstrations to implement, maintain, and troubleshoot modern irrigation systems across diverse agricultural and landscape settings. The program targets professionals eager to optimize water usage and contribute to sustainable farming and horticulture practices.

Programme Curriculum

Training Course on Advanced Irrigation System Design, Installation, and Maintenance

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Objectives

1. Understand water-efficient irrigation system technologies and trends.
2. Design and plan advanced drip and sprinkler systems for various terrains.
3. Learn smart irrigation control systems with IoT integration.
4. Analyze soil-water-plant relationships for precision irrigation.
5. Calculate water flow rates, pressure loss, and irrigation efficiency.
6. Install and configure automated irrigation systems professionally.
7. Develop maintenance protocols to extend irrigation system lifespan.
8. Identify and solve common irrigation system faults.
9. Implement filtration and fertigation techniques for optimal performance.
10. Adapt irrigation strategies for climate-resilient agriculture.
11. Apply GIS and remote sensing in irrigation planning.
12. Evaluate the environmental and economic benefits of modern irrigation.
13. Ensure regulatory compliance and safety in irrigation projects.

Target Audiences

1. Agricultural engineers
2. Farm managers and agronomists
3. Landscape architects and contractors
4. Irrigation technicians and plumbers
5. Environmental consultants
6. Water resource managers
7. Urban planners and municipalities
8. Students and educators in agricultural sciences

Course Duration: 10 days

Course Modules

Module 1: Introduction to Irrigation Systems

- History and evolution of irrigation
- Overview of irrigation system types
- Key components of modern systems
- Benefits of precision irrigation
- Sustainability and climate impact
- **Case Study**: Evolution of irrigation in Kenya’s semi-arid regions

Module 2: Water Resource Management

- Water sourcing and availability
- Legal and regulatory considerations
- Calculating water requirements
- Rainwater harvesting and storage
- Water conservation techniques
- **Case Study**: Water budgeting in Israeli desert farms

Module 3: Soil-Water-Plant Relationships

- Soil texture and water holding capacity

- Plant root zone and water uptake
- Infiltration and percolation
- Evapotranspiration fundamentals
- Importance of irrigation scheduling
- **Case Study**: Maximizing yield in loamy soil vineyards

Module 4: Drip Irrigation Design and Layout

- Components of drip systems
- Lateral and sub-main layout principles
- Emitter spacing and flow rate design
- Pressure loss calculations
- Fertigation line integration
- **Case Study**: Drip system for avocado plantations in Peru

Module 5: Sprinkler Irrigation Systems

- Types of sprinklers and nozzles
- Sprinkler spacing and uniformity
- Pipe sizing and pressure regulation
- Sprinkler automation integration
- Troubleshooting low-pressure issues
- **Case Study**: Sprinkler systems for golf courses in the US

Module 6: Smart Irrigation Technologies

- IoT and sensor-based irrigation
- Weather-based irrigation controllers
- Soil moisture sensor deployment
- Mobile app-based system control
- Data-driven irrigation scheduling
- **Case Study**: Smart irrigation for urban landscapes in Dubai

Module 7: Hydraulic Design and Calculations

- Water pressure and flow rate basics
- Pipe friction loss and head loss
- Pump sizing and efficiency
- Elevation impact on hydraulics
- Software tools for hydraulic design
- **Case Study**: Pump system design for terraced farms in Ethiopia

Module 8: System Installation and Commissioning

- Trenching and pipe laying techniques
- Valve and filter installation
- Backflow prevention devices
- Testing and flushing the system
- Startup procedures and adjustments
- **Case Study**: Installation of hybrid systems in Nigeria

Module 9: Filtration and Water Quality

- Types of filtration systems
- Filter sizing and selection
- Sand vs. screen vs. disk filters

- Maintenance and cleaning protocols
- Addressing salinity and clogging
- **Case Study**: Salinity control in drip systems in India

Module 10: Fertigation and Chemigation

- Benefits of fertigation
- Nutrient injection units
- Mixing and dilution ratios
- Compatibility of fertilizers
- Safety and calibration practices
- **Case Study**: Tomato fertigation in greenhouses in Spain

Module 11: Maintenance and Troubleshooting

- Routine system inspections
- Emitter and sprinkler cleaning
- Leak detection and repairs
- Diagnosing uneven distribution
- Preventive maintenance plans
- **Case Study**: Cost-saving maintenance strategies in California

Module 12: Climate-Responsive Irrigation

- Irrigation under drought conditions
- Mulching and moisture conservation
- Adjusting schedules for rainfall
- Wind, humidity, and heat factors
- Climate-smart irrigation practices
- **Case Study**: Climate-resilient irrigation in East Africa

Module 13: Irrigation System Automation

- Control valves and solenoids
- Timers and scheduling devices
- Integration with mobile platforms
- Remote troubleshooting
- Battery vs. solar-powered controllers
- **Case Study**: Automation in vertical farming in Singapore

Module 14: GIS and Remote Sensing in Irrigation

- Use of GIS for irrigation mapping
- Remote sensing for crop monitoring
- Integration with weather data
- Site-specific irrigation planning
- Decision support systems
- **Case Study**: GIS-led irrigation design in South Africa

Module 15: Sustainability and Impact Evaluation

- Measuring irrigation efficiency
- Reducing water and energy footprint
- Environmental impact assessments
- ROI and cost-benefit analysis
- Policy compliance and reporting

- **Case Study**: Sustainable irrigation project in Morocco

Training Methodology

- Hands-on demonstrations and field visits
- Group discussions and problem-solving sessions
- Use of simulation software and digital tools
- Real-world case studies and industry examples
- Interactive lectures with expert trainers
- Quizzes, assignments, and certificate evaluation

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

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