



A) Course Details:

- **Course Title:** Smart Farming & IoT in Agriculture
- **Duration:** 6 months
- **Level:** Advanced Certificate
- **Credits:** The number of credits per module will be provided in the module details below.

B) Module Overview:

Module Code	Module Name	Study Hours	Credits
SFIA101	Introduction to Smart Farming and IoT	50 hours	6 credits
SFIA102	Precision Agriculture Technologies	60 hours	7 credits
SFIA103	Sensor Networks and Data Analytics	40 hours	5 credits
SFIA104	IoT Applications in Crop Management	55 hours	6 credits
SFIA105	Livestock Monitoring with IoT	45 hours	5 credits
SFIA106	Smart Irrigation Systems	50 hours	6 credits
SFIA107	Drones and Robotics in Agriculture	60 hours	7 credits
SFIA108	Data Security and Privacy in Agriculture	45 hours	5 credits
SFIA109	Farm Management Software	55 hours	6 credits
SFIA110	Capstone Project: Implementing Smart Farming Solutions	70 hours	8 credits

C) Main Aims and Objectives:

1. Introduce the principles and technologies of Smart Farming and IoT in Agriculture.
2. Equip participants with advanced knowledge in Precision Agriculture Technologies.
3. Explore the role of Sensor Networks and Data Analytics in modern agriculture.
4. Understand the application of IoT in Crop Management for increased efficiency.
5. Implement Livestock Monitoring solutions using IoT devices.
6. Optimize water usage through Smart Irrigation Systems.
7. Harness the potential of Drones and Robotics for agricultural applications.
8. Address concerns of Data Security and Privacy in the context of agriculture.
9. Familiarize participants with Farm Management Software for data-driven decision-making.
10. Apply acquired knowledge through a comprehensive Capstone Project.

D) Detailed Outline of The Syllabus Per Module:

1. **Module SFIA101: Introduction to Smart Farming and IoT**
 - Overview of Smart Farming
 - Introduction to Internet of Things (IoT)
 - Role of Technology in Modern Agriculture
 - Case Studies of Smart Farming Success

2. **Module SFIA102: Precision Agriculture Technologies**
 - GPS and GIS Technologies in Agriculture
 - Remote Sensing for Precision Farming
 - Variable Rate Technology (VRT)
 - Autonomous Vehicles in Agriculture

3. **Module SFIA103: Sensor Networks and Data Analytics**
 - Types of Sensors in Agriculture
 - Wireless Sensor Networks
 - Data Collection and Analysis Techniques
 - Decision Support Systems

4. **Module SFIA104: IoT Applications in Crop Management**
 - Crop Monitoring and Yield Prediction
 - Smart Greenhouses and Indoor Farming
 - Precision Fertilization and Pest Control
 - Real-time Crop Health Monitoring

5. **Module SFIA105: Livestock Monitoring with IoT**
 - Wearable Sensors for Livestock
 - IoT Applications in Animal Health
 - Tracking and Monitoring Livestock Behavior
 - Remote Veterinary Consultations

6. **Module SFIA106: Smart Irrigation Systems**
 - IoT-enabled Water Management
 - Soil Moisture Sensors and Irrigation Automation
 - Efficient Water Use in Agriculture
 - Case Studies of Successful Irrigation Systems

7. **Module SFIA107: Drones and Robotics in Agriculture**
 - Agricultural Drones: Types and Applications
 - Robotic Systems for Planting and Harvesting
 - Monitoring Crop Health with Drones
 - Automation in Precision Agriculture

8. **Module SFIA108: Data Security and Privacy in Agriculture**
 - Cybersecurity Risks in Smart Farming
 - Secure Data Transmission and Storage
 - Compliance with Data Privacy Regulations
 - Case Studies on Data Breach Prevention

9. **Module SFIA109: Farm Management Software**
 - Introduction to Farm Management Software
 - Features and Applications of AgTech Software
 - Integration with IoT and Sensor Networks
 - Hands-on Training with Farm Management Tools

10. **Module SFIA110: Capstone Project: Implementing Smart Farming Solutions**
 - Project Planning and Proposal
 - Implementation of Smart Farming Solutions
 - Data Collection, Analysis, and Presentation
 - Evaluation and Reflection on the Project

E) Practicals:

Module Code	Practical Details
SFIA101	IoT Device Setup and Configuration
SFIA102	Hands-on Experience with GPS and GIS Technologies
SFIA103	Building a Wireless Sensor Network
SFIA104	Implementing IoT for Crop Management
SFIA105	Livestock Monitoring with Wearable Sensors
SFIA106	Installation and Calibration of Smart Irrigation Systems
SFIA107	Drone Operation and Data Collection
SFIA108	Implementing Data Security Measures
SFIA109	Hands-on Training with Farm Management Software
SFIA110	Capstone Project Implementation

F) Industrial Internship Duties (8 weeks):

1. Engaging with a Smart Farming or Precision Agriculture operation.
2. Assisting in the deployment and maintenance of IoT devices.
3. Participating in data collection and analysis tasks.
4. Collaborating with farm management teams on technology integration.
5. Gaining hands-on experience with sensor networks and drone operations.
6. Contributing to the development and implementation of precision farming strategies.
7. Addressing data security and privacy concerns in an agricultural setting.
8. Assisting in the use and optimization of farm management software.
9. Learning about the practical challenges and opportunities in Smart Farming.
10. Presenting insights and recommendations based on the internship experience.

G) Country Benefits:

1. Increased agricultural productivity and efficiency.
2. Adoption of sustainable and resource-efficient farming practices.
3. Strengthened position in global agriculture technology markets.
4. Enhanced food security through improved yield and crop management.
5. Attraction of investment in agtech and smart farming infrastructure.
6. Development of a skilled workforce in precision agriculture technologies.
7. Improved environmental sustainability in agriculture.
8. Opportunities for international collaboration in agtech research and development.
9. Positive impact on rural economies through technological advancements.
10. Establishment as a leader in smart farming practices.

H) Students' Entrepreneurship Benefits:

1. Proficiency in developing and implementing Smart Farming solutions.
2. Knowledge of precision agriculture technologies for innovative farming ventures.
3. Understanding of data-driven decision-making in agriculture.
4. Skills in addressing cybersecurity challenges in agtech entrepreneurship.
5. Capability to integrate IoT and sensor technologies for farm optimization.
6. Networking opportunities with agtech professionals and investors.
7. Access to mentorship for entrepreneurial success in agriculture technology.
8. Potential to contribute to sustainable and environmentally conscious farming practices.
9. Opportunity to launch startups focusing on farm management software.
10. Development of a comprehensive capstone project for a portfolio of entrepreneurial ventures.

I) Recommended Books and Materials:

- "Precision Agriculture Technology for Crop Farming" by Pedro Diaz-Sierra
- "Internet of Things (IoT) Technologies for Agricultural and Environmental Monitoring" by Angel Ortiz
- "Smart Farming: IoT Applications in Agriculture" by Muhammad Adeel
- "Data Science for Agriculture" by Rakhi Choudhary
- "Farm Management" by Kay Oltremari
- Agricultural and IoT technology journals, online resources, and industry publications.

J) Admission:

- Open to individuals with an interest in agriculture, technology, and innovation. No specific prerequisites; anybody with enthusiasm and a commitment to learning can apply.