

AGT-850	Digital Technologies in Agriculture	3(3-0)
---------	-------------------------------------	--------

1. **Course Description**

Digital technologies are used to optimize key components of food systems, increasing productivity and profitability, while reducing environmental impacts. Virtually all stages of production, from refining crop genetics to managing transportation logistics, have the potential to be digitally integrated in the near future. This course provides an insight to new means and methods for farmers to further optimize management of resources, improve crop quality and quantity, and remain sustainable and productive in a changing climate

2. **Educational Objectives**

The course will

- a. Provide an overview of cutting edge digital agricultural technologies and their impact on agriculture systems
- b. Impart understanding of how digital technologies can lead to more efficient and sustainable agriculture systems
- c. Provide students the opportunity to creatively seek solutions to agricultural issues through other disciplines of science and technology like engineering, robotics and information technology.

3. **Course Outcomes**

Upon successful completion of this course, the students will be able to

- a. Describe the major digital technologies and their uses in agriculture
- b. Apply knowledge of different discipline to suggest solutions for problems in agriculture industry
- c. Optimize farm management practices using digital technologies

4. **Course Contents**

- a. Introduction to Smart Farming
- b. Sensor Technology
- c. Internet of Things (IoT)
- d. Automation and Precision Agriculture

- (1) GIS and GPS
- (2) Remote Sensing and image processing
- (3) Real-time Kinematics
- (4) Variable Rate Application Technology (VRAT)
- (5) Precision Fertigation
- (6) Hardware Telematics and Warnings
- e. Data Management
 - (1) Data Science
 - (2) Data Informatics and Analytics
 - (3) Cloud Computing for Data management
- f. Artificial Intelligence in Agriculture Industry
 - (1) Agricultural Robots and Drones
 - (2) Crop and Soil Monitoring
 - (3) Supervised and Unsupervised Data Classification
 - (4) Predictive Analytics for decision support systems
- g. Data Visualization
 - (1) Web portal and Web services development
 - (2) Data querying and info graphics
 - (3) Mobile Phone Apps for weather and climate information
- h. Digitization of Livestock Industry
- i. Tracking technologies in agricultural supply chain
 - (1) Block-chain technology
 - (2) Radio Frequency Identification (RFID)
- j. Each student will have to submit a proposal: innovative digital solution for a problem along the agriculture supply chain

5. **Recommended Books**

- a. Precision Agriculture Technology for Crop Farming, (1st Edition) Ed. Qin Zhang, CRC Press. 2015
- b. Digital Technologies for Agricultural and Rural Development in the Global South, Ed. Richard Duncombe, CABI. 2018