Agriculture Data Science (Certificate)

All areas of agriculture, food, and life science have seen an explosion in data collection, ranging from plant breeders collecting phenotypic information to drones imaging fields to companies accumulating sales information. Professionals in industry, governmental, non-governmental and academics need post-baccalaureate training on how to properly collect, manage and analyze the data and then make appropriate decisions using the data.

Students will be able to take their training in this certificate in many different directions depending on their educational and employment needs. In data mining and predictive modeling, our students look for useful patterns in large data sets that would allow them to understand the past and better predict the future. In artificial intelligence and the related processes of machine learning and deep learning, our students will go several steps further, creating machines and algorithms that not only analyze and understand data, but also take the next logical steps dictated by the data.

This program will combine SAS data management and analysis techniques with computer science and statistical training to allow students to apply the processes of data mining and artificial intelligence to critical agriculture, food and life science issues. This certificate is intended for those students who have completed a BS degree in agriculture, food or life science and need additional training to be able to manage and use data in their fields. This certificate is also intended for those students who have completed a BS degree in computer science, mathematics or statistics and need additional training in how to apply data science techniques to agriculture, food and life science data issues. Students currently enrolled in a graduate program will also be eligible to complete the certificate.

Plan Requirements

Certificates are distributed as "Graduate Certificate in Agriculture Data Science" without track specifications.

Code	Title	Hours	Counts towards
Required Courses		**6**	
ST 525	Statistics and Computing for Agricultural Data Science		
BAE 542	Advanced Analytics to Agriculture, Food and Life Sciences Data		
Track Requirements		**6**	
Select one of the following tracks:			
Track A: Data Science Fundamentals (p. 1)			
Track B: Data Science Applications in Agriculture, Food, Life Science, and Agricultural Economics (p. 1)			
Total Hours		**12**	

Track A: Data Science Fundamentals

Code	Title	Hours	Counts towards
Select 6 hours of the following courses:			
BAE 555/455	R Coding for Data Management and Analysis	3	
BAE 565	Environmental and Agricultural Analytics and Modeling	3	
CSC 440	Database Management Systems	3	
CSC/ST 442	Introduction to Data Science	3	
CSC 505	Design and Analysis Of Algorithms		
CSC 520	Artificial Intelligence I		
CSC 530	Computational Methods for Molecular Biology		
CSC 540	Database Management concepts and Systems		
CSC 541	Advanced Data Structures		
ST 563	Introduction to Statistical Learning	3	
ECE 488/588/ PB 488/588	Systems Biology Modeling of Plant Regulation	3	
ECE 542	Neural Networks	3	

Track B: Data Science Applications in Agriculture, Food, Life Science and Agricultural Economics

Code	Title	Hours	Counts towards
Select 6 hours of the following courses:			
AEHS 777	Qualitative Research Methods in the Agricultural Education and Human Sciences	3	

AEC 510	Machine Learning Approaches in Biological Sciences	2
AEC/FW 726	Quantitative Fisheries Management	3
ANS/GN 713	Quantitative Genetics and Breeding	
ANS/CS/FOR 726	Advanced Topics In Quantitative Genetics and Breeding	3
BAE 535	Precision Agriculture Technology	3
BAE 536	GIS Applications in Precision Agriculture	1
CS 714	Crop Physiology: Plant Response to Environment	
CS/HS/GN 745	Quantitative Genetics In Plant Breeding	1
CS 755	Applied Research Methods and Analysis for Plant Sciences	3
ECG/ST 561	Applied Econometrics I	3
ECG 562	Applied Econometrics II	3
ECG 563	Applied Microeconometrics	3
ECG 590	Special Economics Topics	
ECG/ST 750	Introduction to Econometric Methods	
ECG/ST 751	Econometric Methods	
ECG/ST 752	Time Series Econometrics	
ECG/ST 753	Microeconometrics	
ECG 766	Computational Methods in Economics and Finance	
ECG 739	Empirical Methods for Development Economics and Applied Microeconomics	3
ENT/GES 506	Principles of Genetic Pest Management	
GN 550/450	Conservation Genetics	3
GN/HS/ST 757	Quantitative Genetics Theory and Methods	3
PP/MB 715	Applied Evolutionary Analysis of Population Genetic Data	
SSC 540	Geographic Information Systems (GIS) in Soil Science and Agriculture	3
SSC 545	Remote Sensing Applications in Soil Science and Agriculture	