Comprehensive Data Management in Agriculture
ABE 6933 – Special Topics in Agricultural and Biological Engineering
Tuesdays (10:40 am to 11:30 am) and Thursdays (10:40 am to 12:35 pm), January 13th – April 21st
Location: Frazier Rogers Hall 211
Academic Term: Spring 2026
Three (3) credit hours

Instructor:
Willingthon Pavan
wpavan@ufl.edu
352-294-6736
Office Hours: Wednesday, 9:00 am-11:00 am, Frazier Rogers Hall – 279 or Zoom (contact to schedule office hours)

Course Description

This course is tailored for undergraduate and graduate students, aiming to provide a thorough understanding of data management. It covers a broad range of topics, from general data management practices and database systems to specialized topics like research data management, Database Management Systems, Microsoft Excel data handling, and data harmonization, following the FAIR principles (findable, accessible, interoperable, and reusable).

Course Pre-Requisites / Co-Requisites

1. Basic computer literacy: Students should be comfortable using computers and familiar with basic software applications.
2. Basic knowledge of Microsoft Excel: Since the course covers data handling in Excel, students should have a basic understanding of how to use this software.
3. Research methods: Some familiarity with research methods could be beneficial, especially for the research data management topic.

Course Objectives

By the end of the course, students will be able to:
1. Define the roles and types of databases in data management in Agriculture.
2. Create and implement data models using SQL and NoSQL databases.
3. Ensure data integrity, conduct transactions, and maintain security.
4. Utilize Microsoft Excel for agriculture data management tasks.
5. Incorporate the FAIR principles in agriculture research data management.
6. Develop detailed data management plans for agriculture research projects.
7. Harmonize data from different sources to maintain consistency.
8. Identify and apply ethical and legal principles in agriculture data management and sharing.
9. Comprehend the significance of publishing data for wider access.
10. Employ Git and GitHub for version control and collaborative coding projects.
11. Integrate coding tools with data management systems to streamline data handling processes.

Materials and Supply Fees

None.

Required Software and Textbooks

Software:
- Git/GitHub/GitLab
- Sourcetree
- PostgreSQL
- NoSQLBooster
- Microsoft Excel

Textbooks: N/A

Recommended Materials

Various academic articles and online resources will be provided along with the recommended sources available at the UF libraries:

- Ghavami, P. K. (2021). *Big data management data governance principles for big data analytics*. Berlin: Walter de Gruyter GmbH.
- Deborah, L.J., Vijayakumar, P., Gupta, B.B., & Pelusi, D. (Eds.). (2023). Secure Data Management for Online Learning Applications (1st ed.). CRC Press. https://doi.org/10.1201/9781003264538
- Pera, K. (2023). Big Data for Big Decisions: Building a Data-Driven Organization (1st ed.). Auerbach Publications. https://doi.org/10.1201/9781003321347
- *Big Data Management in Sensing: Applications in AI and IoT*, edited by Renny Fernandez, River Publishers, 2021. *ProQuest Ebook Central*, https://ebookcentral.proquest.com/lib/ufl/detail.action?docID=30251845.
- Armstrong, L. (Ed.). (2020). Improving data management and decision support systems in agriculture (1st ed.). Burleigh Dodds Science Publishing. https://doi.org/10.1201/9781003047872
- Boehm, Matthias, et al. *Data Management in Machine Learning Systems*, Springer International Publishing AG, 2019. *ProQuest Ebook Central*, https://ebookcentral.proquest.com/lib/ufl/detail.action?docID=5721142.
- Williams, R. (1992). Data Management and Data Description (1st ed.). Routledge. https://doi.org/10.4324/9780429463662
- bin Uzayr, S. (Ed.). (2023). Mastering SQL: A Beginner's Guide (1st ed.). CRC Press. https://doi.org/10.1201/9781003358435
- Various academic articles and online resources (to be provided).

Required Computer

Recommended computer specifications: https://it.ufl.edu/get-help/student-computer-recommendations
HWCOE Computer Requirements: https://www.eng.ufl.edu/students/advising/fall-semester-checklist/computer-requirements

Course Schedule

Week	Lecture	Day	Topics	Assignments
1	1	13-Jan	Introductions & Ice breaking	Meet & greet
	2	15-Jan	Introduction and the Importance of Data Management in Agronomy, Types of Data	
2	3	20-Jan	Data Documentation, Metadata, Data Organization (Environmental and agricultural contexts)	
	4	22-Jan		HW1
3	5	27-Jan	Data Modeling, Normalization, Diagrams	Quiz1
	6	29-Jan		
4	7	3-Feb	Databases Manipulation	
	8	5-Feb		HW2
5	9	10-Feb	Transaction Management, DBMS, and SQL	Quiz2
	10	12-Feb		

6	11	17-Feb	Database Management Systems (Hands-on)	
	12	19-Feb	Data Privacy and Security	HW3
7	13	24-Feb	Data Sharing, Long-term storage, and preservation	Quiz3
	14	26-Mar		
8	15	3-Mar	Version Control (Hands-on activity: Managing Data with Git)	
	16	5-Mar	Basics of Excel, Data Cleaning	HW4
9	17	10- Mar	Using Excel for Quality Control and Assurance	Quiz4
	18	12-Mar	Data Analysis and Visualization	
			Spring Break (16-21)	
10	19	24-Mar	AgCentric Data Privacy and Security Measures.	HW5
	20	26-Mar	Introduction to Data Governance	Quiz5
11	21	31-Mar	Data Governance Principles & Introduction to Research Data Management: The FAIR Principles	
	22	2-Apr	The FAIR Principles (continue) Practical activity	
12	23	7- Apr	Data Management Plans, Tools, and Strategy (Environmental and agricultural contexts)	HW6
	24	9-Apr	Principles and Practices of Data Harmonization	Quiz6
13	25	14-Apr	Ethical and Legal Considerations, Data Ownership, Data Access, and Data Versioning	
	26	16-Apr	**Project Presentations** **Project Report Due**	
14	27	21-Apr	**Project Presentations**	

Attendance Policy, Class Expectations, and Make-Up Policy
Excused absences must be consistent with university policies in the Graduate Catalog (https://catalog.ufl.edu/graduate/regulations) and require appropriate documentation. Additional information can be found here: https://gradcatalog.ufl.edu/graduate/regulations/

Please carefully read the following eight topics pertaining to class expectations and make-up policies:

1. Communications

   General information:
   a. The primary means to get help with a problem, other than office hours, will be the Canvas discussion boards. I will check the board daily, to answer inquiries. Other students should feel free to post responses to these questions as well within the guidelines discussed in the sections on collaboration and course etiquette.
   b. Questions about grades or personal issues may be emailed to me at wpavan@ufl.edu or within Canvas. You are welcome to talk with me during office hours or set up an appointment.

   Expectations: if you have an issue or need help, do not wait to ask about it! Problems are generally easier to solve sooner rather than later. You are expected to contribute to the ongoing constructive feedback that is an essential part of the learning process.

2. Attendance Policy:

   General information: attendance is not required though summative and cumulative assessments, such as practice quizzes, collaborative teamwork, graded exercises, and participation, will happen during synchronous class meetings (including in an online setting, if any).
   Expectations: I will prepare course materials with the expectation that students will attend class synchronously and bring a computer to follow along with any practical implementations.

3. Grading Policy:

   General information: All assignments will have a grading rubric and submissions will be graded based on the assignment's rubric. For maximum credit, students must submit correct and elaborated answers that follow instructions. For assignments that require code, clean, easy to read, easy to run, and well commented code is required.
   Expectations: I will expect that students will complete all assignments with care, ensure that submissions are complete and illustrate the understanding of the concepts being assessed.

4. Late Work:

   General information: all submissions are accepted until the assignment solutions are posted but will lose the "on- time" points listed in the rubric.
   Expectations: I will expect students to follow all deadlines. In case of conflict, I expect that students will communicate with me and let me know well in advance about any conflicting issues in order to avoid losing the "on-time" points.

5. Make-Up Policy

   General information:
   a. If you feel that any graded assignment needs to be re-graded, you must discuss this with the instructor within one week of grades being posted for that assignment. If approved, the entire assignment will be subject to complete evaluation.
   b. If you have an academic conflict with any assignment or exam date/time, please let me know well in advance so the necessary changes can be made and make the appropriate accommodations available.
   Expectations: I will expect that students will communicate with me and let me know well in advance about any conflicts or time/date change requests.
   Excused absences must be consistent with university policies in the undergraduate catalog (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx) and require appropriate documentation.

6. Collaboration

   General information: in solving any individual assignments, healthy discussion and collaboration amongst classmates is encouraged. Healthy collaboration includes:
   a. discussing and explaining general course material.
   b. discussing assignments for better understanding.
   c. aiding for general programming and debugging issues.
   Expectations: if another student contributes substantially to your understanding of a problem, you should cite this student to let myself be aware of your similar interpretations of a problem. You will not be negatively judged for citing another student.

7. Cheating and Plagiarism

   General information: while collaboration is encouraged, you are expected to submit your own work and follow the student honor code. Submitting work completed by another student is considered plagiarism and will be dealt according to university policy. In general, if you do not understand your solution, the work is not your own. Examples of plagiarism include:
   a. copying (or allowing someone to copy), even partially, an assignment solution or program from the course.
   b. submitting material, particularly code, using material taken from another source without proper citation.
   c. obtaining solutions to assignments or exams through inappropriate means.

Expectations: I expect all students to be bound to the honor pledge as indicated in the student honor code. If you are suspected of dishonest academic activity, I will invite you to discuss it further in private. Academic dishonesty will likely result in grade reduction, with severity depending on the nature of the dishonest activity. I am obligated to report on academic misconduct with a letter to the department, college and/or university leadership. Repeat offences will be treated with significantly greater severity.

8. Course Etiquette

- Be present. This will allow you to get the most out of class time, as well as for your classmates to get the most out of their collaborations with you.
- Put your cell phone away unless you are actively using it to further the class activities.
- Be prepared. The readings and videos are carefully chosen to support the in-class activities.
- Listen carefully and do not interrupt others.
- Give quality feedback. What constitutes "quality" will be discussed in class.
- Respect the opinions of others, even when you do not agree.
- Keep an open mind, embrace the opportunity to learn something new.
- Avoid monopolizing the discussion. Give others a chance to contribute and be heard.
- Do not be afraid to revise your ideas as you gather more information.
- Try to look at issues from more than one perspective.
- Respect others by learning and using the name and pronoun they prefer.
- Do not use offensive language.

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Quizzes	100 each	30%
Homeworks	100 each	30%
Project Presentation	100	20%
Project Report	100	20%
		100%

Grading Policy

Percent	Grade	Grade Points
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at:
UF Graduate Catalog
Grades and Grading Policies

Students Requiring Accommodations
Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. It is

important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

In-Class Recording
Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session. Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

University Honesty Policy
UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (https://sccr.dso.ufl.edu/process/student-conduct-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Academic Policies & Campus Resources

https://go.ufl.edu/syllabuspolicies

Commitment to a Safe and Inclusive Learning Environment
The Herbert Wertheim College of Engineering values varied perspectives and lived experiences within our community and is committed to supporting the University's core values, including the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information, and veteran status.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:
• Your academic advisor or Graduate Program Coordinator
• HWCOE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
• Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
• Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use
All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy
There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: https://registrar.ufl.edu/ferpa.html

Student Complaints
At the University of Florida, we are committed to maintaining a respectful, fair, and academically enriching environment for all students. Under the Student Honor Code and Student Conduct Code (Regulation 4.040 - https://policy.ufl.edu/wp-content/uploads/2021/12/4-040_2021-12-06.pdf), we recognize that issues and disagreements may arise, necessitating a structured and fair process for lodging and addressing complaints.

We encourage students to voice their concerns or grievances in a constructive manner. This can include, but is not limited to, issues related to academic integrity, student conduct, interpersonal conflicts, and other aspects of university life that may impact a student's experience.

To file a complaint, students should follow the prescribed procedures outlined in the Student Honor Code and Student Conduct Code. These procedures are designed to ensure that all complaints are heard, investigated, and resolved in a manner that is just and consistent with the university's values and policies.

The University of Florida values open communication and the well-being of its student community. We are dedicated to addressing concerns promptly and effectively, ensuring that our campus remains a conducive environment for learning, growth, and academic excellence.

Campus Resources:
Health and Wellness

> **U Matter, We Care:**
> Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.
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> **Counseling and Wellness Center:** https://counseling.ufl.edu, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.
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> **Sexual Discrimination, Harassment, Assault, or Violence**
> If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)
Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.

Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling; https://career.ufl.edu.

Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/.

Student Complaints Campus: https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/; https://care.dso.ufl.edu.

On-Line Students Complaints: *https://distance.ufl.edu/getting-help/*; *https://distance.ufl.edu/state-authorization-status/#student-complaint*.