

AOM4455
AGRICULTURAL OPERATIONS AND SYSTEMS
SPRING 2025

1. Catalog Description: *3 credits.* Quantitative and managerial techniques for management and planning of technical resources in agriculture. Agricultural production and processing are viewed as systems, and system management and optimization tools are reviewed and applied. Applications of queuing theory, project scheduling, optimization and expert decision systems, linear programming, data and risk analysis are presented.

2. Instructors:

- a. Dr. Adam Watson
- b. Office location: 113 Frazier Rogers Hall
- c. Telephone: 352-294-6740
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- e. Course site: Canvas e-Learning
- f. Office hours: MWF 1:55pm – 3:50pm or by appointment

- a. Dr. Gopal Kakani
- b. Office location: 263 Frazier Rogers Hall
- c. Telephone: 352-294-6746
- d. Email address: vgkakani@ufl.edu
- e. Course site: Canvas e-Learning
- f. Office hours: MW 2:00pm – 3:00pm or by appointment

- a. Dr. Clyde Fraisse
- b. Office location: 271 Frazier Rogers Hall
- c. Telephone: 352-249-6742
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- e. Course site: Canvas e-Learning
- f. Office hours: MW 2:00pm – 3:00pm or by appointment

Your professors have an open-door policy, so do not hesitate to stop by their offices. If they are not in their office, please email them and they will respond shortly.
IMPORTANT: When contacting your professors or teaching assistant, please allow up to 48 hours for a response, not including weekends or holidays.

3. Teaching Assistant

- a. Mauricio Zientarski Karrei
- b. Course site: Canvas e-Learning
- c. Office hours: By appointment

4. Meeting Times: MWF 4th Period (10:40am – 11:30am)

5. Meeting Location: 110 Frazier Rogers Hall.

6. Pre-requisites: MAC1147 or MAC1114 & MAC1140 or MAC2233 & CGS2531

7. Course Objectives:

Students, upon completing this course, will be able to:

- a. Apply business management principles to analyze systems issues in agricultural operations.
- b. Solve optimization problems using mathematical and statistical techniques
- c. Provide both theoretical knowledge and practical skills and prepare to engage with and contribute to the growing field of carbon credits and climate change mitigation.
- d. Integrate climate and weather factors into risk assessments of production agriculture

8. Material and Supply Fees: None

9. Textbooks and Software Required:

No textbook is required for this course; however, students are expected to have and use Microsoft Office Excel and Word during the course. In addition, students should review the following to prepare them for using Excel:

<https://www.lynda.com/Excel-tutorials/Excel-Quick-Tips/530432-2.html?org=ufl.edu>

10. Recommended Reading:

None

11. Course Outline:

1 Cost of Ownership and Time Value of Money

- 1.1 Introduction
- 1.2 Total Cost of Ownership
- 1.3 Timelines
- 1.4 Compounding and Future Value
- 1.5 Discounting and Present Value
- 1.6 Periodic Payments
- 1.7 Using Microsoft Excel as a Financial Calculator

2 Depreciation

- 2.1 Introduction
- 2.2 Straight-line Depreciation Method
- 2.3 Sum of the Digits Depreciation Method
- 2.4 Declining Balance Depreciation Method
- 2.5 Deductions
- 2.6 MACRS

3 Linear Programming

- 3.1 Introduction
 - 3.2 Problem Formulation
 - 3.3 A Simple Maximization Problem
 - 3.4 Slack and Surplus Variables
 - 3.5 Extreme Points
 - 3.6 Linear Programming Using Microsoft Excel
 - 3.7 A Simple Minimization Problem
 - 3.8 Special Cases in Linear Programming
- 4 Output Decisions for Agribusiness and Operations Systems**
- 4.1 Introduction
 - 4.2 Business Decisions
 - 4.3 Costs, Cost Functions, and Marginal Cost
 - 4.4 Revenue, Revenue Functions, and Marginal Revenue
 - 4.5 Break-even and Profit Maximization
 - 4.6 Deriving Functions with Regression in Microsoft Excel
- 5 Systems Reliability and Risk**
- 5.1 Introduction
 - 5.2 Reliability of Components
 - 5.3 Failure Rates
 - 5.4 Systems Reliability
 - 5.5 Components of Series and Parallel Systems
 - 5.6 Uncertainty and Risk
- 6 Introduction to Carbon Credits and Scientific Basis**
- 6.1 Definition, Purpose, Context
 - 6.2 Footprint and emission sources
 - 6.3 Key concepts
 - 6.4 Carbon Cycle and Greenhouse gases
 - 6.5 MMRV and Sequestration Technologies
- 7 Policies, Regulations, Markets, and Trading**
- 7.1 International, National and Regional Policies
 - 7.2 Voluntary and Compliance Markets
 - 7.3 Market Mechanisms
 - 7.4 Pricing, Exchanges, Finance
 - 7.5 Participants
- 8 Social and Environmental Impacts and Future Trends**
- 8.1 Sustainable Development Goals (SDGs)
 - 8.2 Co-benefits, Challenges and Controversies
 - 8.3 Net-Zero and beyond
 - 8.4 Emerging Technologies and Nature-based solutions
 - 8.5 Rights and Corporate Social Responsibility
- 9 Project Development and Exercises**

- 9.1 Project types, design, and development
- 9.2 Verification, Certification, Risk
- 9.3 Carbon Intensity Calculation
- 9.4 Project Design or Case Study

10 Climate Risk in Agriculture

- 10.1 The growing need of climate information
- 10.2 Strategies to reduce climate risk in agriculture
- 10.3 Incorporating weather and climate forecasts into decisions

11 Florida's Climate and Drivers of Climate Variability in the Southeast USA

- 11.1 Drivers of climate: latitude, elevation, land and water distribution, ocean currents, pressure systems, prevailing winds
- 11.2 Precipitation and air temperature patterns across Florida
- 11.3 El Niño Southern Oscillation (ENSO) effects on Florida and the SE USA

12 AgroClimate Indices for Crop Management

- 12.1 Temperature effects on crops
- 12.2 Growing degree days tool on AgroClimate.org
- 12.3 Introduction to crop phenology
- 12.4 Heat stress and killing degree days
- 12.5 Chill requirements
- 12.6 Chill hours accumulation tool

13 Crop and Disease Modeling Applications

- 13.1 Introduction to crop yield models
- 13.2 County yield tool on AgroClimate
- 13.3 Planting date planner tool
- 13.4 Disease risk models
- 13.5 Weather index-based crop insurance

14 Climate Change and Agriculture

- 14.1 Introduction to climate change
- 14.2 Greenhouse gas emissions
- 14.3 Potential impacts on crop production
- 14.4 Increasing the resilience of the agriculture industry to climate change

12. Course Schedule

See Canvas for Course Schedule and Due Dates

13. Course Expectations: To be successful in this course, attendance (on time) is important. It is the student's responsibility to contact the instructor(s) in advance of any planned absences, and to make arrangements to make-up and complete assignments. All assignments must be typed and are due one week from when assigned. Assignments must be submitted via Canvas by 11:59 PM of due date. Assignments submitted late, but before 5:00 PM on the day following the due date,

will be marked down 10 points. Assignments returned late, before 5:00 PM on the second day following the due date will be marked down 50 points. No assignments will be accepted after 5:00 PM on the third day following the due date

Our class sessions may be recorded (audio and video) for students in the class to refer back and for remote students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

14. Grades and Grade Points:

For information on current UF policies for assigning grade points, see <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>.

	Points	% of Final Grade
Watson		
Participation 5 @ 5 pts. each	25	
Quizzes 5 @ 15 pts. each	75	
Homework 2 @ 75 pts. each	150	
Watson Portion Total Points	250	25%
Kakani		
Participation 4 @ 5 pts. each	20	
Quizzes 8 @ 10 pts. each	80	
Homework 2 @ 75 pts. each	150	
Kakani Portion Total Points	250	25%
Fraisse		
Participation	50	
Homework 4 @ 50 pts. each	200	
Fraisse Portion Total Points	250	25%
Project	250	25%
TOTAL	1000	100%

Students who have questions about their grades should contact their professor. Do not contact the TA about grades.

A [100.00 – 93.00%]

A- [92.99 – 90.00%]

B+ [89.99 – 87.00%]

- B [86.99 – 83.00%]
- B- [82.99 – 80.00%]
- C+ [79.99 – 77.00%]
- C [76.99 – 73.00%]
- C- [72.99 – 70.00%]
- D+ [69.99 – 67.00%]
- D [66.99 – 63.00%]
- D- [62.99 – 60.00%]
- E [59.99 – 0.00%]

15. Attendance and Make-Up Work: Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at: <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>.

16. Accommodations for Students with Disabilities: Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center. See the “[Get Started With the DRC](#)” webpage on the Disability Resource Center site. 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.

17. 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 education 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 deliver by an 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 presentation such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private 3 Revised: September 2024 conversations between students in the class or between a student and the faculty or guest 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.

- 18. Online Course Evaluation Process:** Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. 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/>.
- 19. Academic Honesty:** 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 Conduct Code specifies a number of behaviors that are in violation of this code and the possible sanctions. See the [UF Conduct Code website for more information](#). If you have any questions or concerns, please consult with the instructor or TAs in this class. It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: (New Link: <https://policy.ufl.edu/regulation/4-040/>).
- 20. Software Use:** All faculty, staff and student 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.
- 21. Campus Helping Resources:** Students experiencing crises or personal problems that interfere with their general wellbeing are encouraged to utilize the university’s counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

Whole Gator App

The Whole Gator and website and app connects UF students with resources dedicated to supporting overall health and well-being. In addition to many of the resources below it also has strategies to practice self-care. <https://one.uf.edu/whole-gator/topics>

Health and Wellness

- U Matter, We Care: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit [U Matter, We Care](#) website to refer or report a concern and a team member will reach out to the student in distress.
- Counseling and Wellness Center: Visit the [Counseling and Wellness Center website](#) or call 352-392-1575 for information on crisis services as well as noncrisis services.
- Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or [visit the Student Health Care Center website](#).
- University Police Department: [Visit UF Police Department website](#) or call 352-392-1111 (or 9-1-1 for emergencies).
- UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; [Visit the UF Health Emergency Room and Trauma Center website](#).
- GatorWell Health Promotion Services: For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the [GatorWell website](#) or call 352-273- 4450.
- Student Success Initiative, <http://studentsuccess.ufl.edu>.

Academic Resources

- E-learning technical support: Contact the [UF Computing Help Desk](#) at 352-392-4357 or via e-mail at helpdesk@ufl.edu.
- [Career Connections Center](#): Reitz Union Suite 1300, 352-392- 1601. Career assistance and counseling services.
- [Library Support](#): Various ways to receive assistance with respect to using the libraries or finding resources. Call 866-281-6309 or email ask@ufl.libanswers.com for more information.
- [Teaching Center](#): 1317 Turlington Hall, 352-392-2010 or to make an appointment 352- 392-6420. General study skills and tutoring.
- [Writing Studio](#): Daytime (9:30am-3:30pm): 2215 Turlington Hall, 352-846-1138 | Evening (5:00pm-7:00pm): 1545 W University Avenue (Library West, Rm. 339). Help brainstorming, formatting, and writing papers.
- Academic Complaints: Office of the Ombuds; [Visit the Complaint Portal webpage for more information](#).
- Enrollment Management Complaints (Registrar, Financial Aid, Admissions): [View the Student Complaint Procedure webpage for more information](#).

Student Complaints

- Residential Course: <https://www.ombuds.ufl.edu/complaint-portal/>

- Online Course: <https://pfs.tnt.aa.ufl.edu/state-authorization-status/#student-complaint>