

**AOM4455**  
**AGRICULTURAL OPERATIONS AND SYSTEMS**  
SPRING 2021

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: 263 Frazier Rogers Hall
  - c. Telephone: 352-294-6740
  - d. Email address: [jaw7385@ufl.edu](mailto:jaw7385@ufl.edu)
  - e. Course site: Canvas e-Learning
  - f. Office hours: MWF 7<sup>th</sup> and 8<sup>th</sup> Periods (1:55pm – 3:50pm) or by appointment  
  - a. Dr. Greg Kiker
  - b. Office location: 291 Frazier Rogers Hall
  - c. Telephone: 352-294-6749
  - d. Email address: [gkiker@ufl.edu](mailto:gkiker@ufl.edu)
  - e. Course site: Canvas e-Learning
  - f. Office hours: TBD  
  - a. Dr. Clyde Fraisse
  - b. Office location: 271 Frazier Rogers Hall
  - c. Telephone: 352-249-6742
  - d. Email address: [cfraisse@ufl.edu](mailto:cfraisse@ufl.edu)
  - e. Course site: Canvas e-Learning
  - f. Office hours: TBD
  
3. **Teaching Assistant:**
  - a. Jason Merrick
  - b. Email address: Canvas

Your professors have an open-door policy, so do not hesitate to stop by his office. 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.

4. **Meeting Times:** MWF 4<sup>th</sup> Period (10:40am – 11:30am)

**5. Meeting Location:** 110 Frazier Rogers Hall. \*This course will also meet synchronously through Zoom for online sections. Please use the Zoom link within Canvas (left-hand side of Canvas Course page under Zoom Conferences) to join each meeting. In the event that class cannot be held safely in-person, the class will resume and meet online through Zoom at the regularly scheduled meeting time.

**6. Pre-requisites and Co-requisites:** None

**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. Demonstrate proficiency in problem solving through optimization techniques
- c. Structure business and environmental decision-making into quantifiable frameworks to assess the role of uncertain events
- d. Trade-off multiple criteria among several alternatives through a structured and defensible decision framework
- e. Incorporate 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 Structured Decision Making**
  - 6.1 Elements of Structured Decisions
  - 6.2 Basic Probability
  - 6.3 Elementary Decision Structuring
  - 6.4 Decision Structuring with Multiple Objectives
  - 6.5 Software for Structuring Decisions
  
- 7 Case Studies for Multi-Criteria Decision Analysis**
  - 7.1 New York / New Jersey Harbor – Contaminated Dredged Material Disposal
  
- 8 Advanced Decision Analysis Concepts**
  - 8.1 Analysis of Decisions with Uncertain Information
  - 8.2 Decision Structuring and Software for Multiple Objectives and Uncertain Information
  - 8.3 Heuristics and Biases in Decision Making
  - 8.4 Prospect Theory and Framing

8.5 Scenario Analysis (if time allows)

**9 Climate Risk in Agriculture**

9.1 The growing need of climate information

9.2 Strategies to reduce climate risk in agriculture

9.3 Incorporating weather and climate forecasts into decisions

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

10.1 Drivers of climate: latitude, elevation, land and water distribution, ocean currents, pressure systems, prevailing winds

10.2 Precipitation and air temperature patterns across Florida

10.3 El Niño Southern Oscillation (ENSO) effects on Florida and the SE USA

**11 AgroClimate Indices for Crop Management**

11.1 Temperature effects on crops

11.2 Growing degree days tool on AgroClimate.org

11.3 Introduction to crop phenology

11.4 Heat stress and killing degree days

11.5 Chill requirements

11.6 Chill hours accumulation tool

**12 Crop and Disease Modeling Applications**

12.1 Introduction to crop yield models

12.2 County yield tool on AgroClimate

12.3 Planting date planner tool

12.4 Disease risk models

12.5 Weather index-based crop insurance

**13 Climate Change and Agriculture**

13.1 Introduction to climate change

13.2 Greenhouse gas emissions

13.3 Potential impacts on crop production

13.4 Increasing the resilience of the agriculture industry to climate change

**12. Attendance, Expectations, and Exam Make-up Policy:** Attendance (on time) at lectures is expected from all students. It is the responsibility of the student to make his or her presence known at the end of class to receive attendance credit. During the course of the semester, students may miss no more than three days without penalty to their attendance grade. There are no exams for this course.

To be successful in this course, students are expected to attend all class meetings. Students who are summoned for jury duty, subpoenaed as a witness, sick or have illness, or who are participating in college-sanctioned activities are excused from class(es) during those events with proper documentation (e.g., doctor's note, jury summons/court appearance, instructor letter, etc.). 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.

Additional information and UF policies related to attendance and expectations, can be found in the [Undergraduate Catalog](#).

### **13. COVID Response Statement**

We will have face-to-face instructional sessions to accomplish the student learning objectives of this course. In response to COVID-19, the following policies and requirements are in place to maintain your learning environment and to enhance the safety of our in-classroom interactions.

- You are required to wear approved face coverings at all times during class and within buildings. Following and enforcing these policies and requirements are all of our responsibility. Failure to do so will lead to a report to the Office of Student Conduct and Conflict Resolution.
- This course has been assigned a physical classroom with enough capacity to maintain physical distancing (6 feet between individuals) requirements. Please utilize designated seats and maintain appropriate spacing between students. Please do not move desks or stations.
- Sanitizing supplies are available in the classroom if you wish to wipe down your desks prior to sitting down and at the end of the class.
- Follow your instructor's guidance on how to enter and exit the classroom. Practice physical distancing to the extent possible when entering and exiting the classroom.
- If you are experiencing COVID-19 symptoms (Click here for guidance from the CDC on symptoms of coronavirus), please use the UF Health screening system and follow the instructions on whether you are able to attend class. Click here for UF Health guidance on what to do if you have been exposed to or are experiencing Covid-19 symptoms.
- Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work. Find more information in the university attendance policies.

Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled 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. Grading:

	<b>Points</b>	<b>% of Final Grade</b>
<b>Watson</b>		
Participation 5 @ 5 pts. each	25	
Quizzes 5 @ 15 pts. each	75	
Homework 2 @ 75 pts. each	150	
<b>Watson Portion Total Points</b>	<b>250</b>	<b>25%</b>
<b>Kiker</b>		
Participation 4 @ 5 pts. each	20	
(In-class only) Quizzes 4 @ 20 pts. each	80	
Homework 2 @ 75 pts. each	150	
<b>Kiker Portion Total Points</b>	<b>250</b>	<b>25%</b>
<b>Fraisse</b>		
Participation	110	
Homework 4 @ 35 pts. each	140	
<b>Fraisse Portion Total Points</b>	<b>250</b>	<b>25%</b>
<b>Project</b>	<b>250</b>	<b>25%</b>
<b>TOTAL</b>	<b>1000</b>	<b>100%</b>

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

#### Grading Scale:

- 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%]

For information on current UF policies for assigning grade points, see the Grades and Grading Policies section of the [UF Undergraduate Catalog](#).

- 15. Assignments:** Assignments will be marked down for a sloppy presentation and, if excessive, they may be returned un-graded. 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

**16. 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. These evaluations are conducted online at [Gator Rater](#). Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at [Gator Rater](#).

**17. Academic Honesty Policy:** All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others. All work must be original and completed individually.

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: *"We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity."* You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit 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."*

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). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. 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 [View the Student Conduct and Honor Codes](#)

**18. Services for Students with Disabilities:** The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom

accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

0001 Reid Hall, 352-392-8565, [Disability Resource Center](#)

**19. Campus Helping Services:** 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.

- [University Counseling & Wellness Center](#), 3190 Radio Road, 352-392-1575,  
Counseling Services  
Groups and Workshops  
Outreach and Consultation  
Self-Help Library  
Wellness Coaching
- *U Matter We Care*, [www.umatter.ufl.edu/](http://www.umatter.ufl.edu/)
- [Career Resource Center](#), First Floor JWRU, 392-1601

#### **Student Complaints:**

Residential course: Dean of Students Office [UF Complaints Policy](#)

Online course: Distance Learning [Student Complaint Process](#)

**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.