

AOM 4314C
Power & Machinery Management
Spring 2020 Course Syllabus

- 1. Catalog Description:** *3 credits. Functional requirements, operating principles, performance, safety and economic application of agricultural power units and field machines for citrus, vegetable and field crop production. (Offered Spring).*
- 2. Pre-requisites and Co-requisites:** *none.*
- 3. Course Objectives:**
Students will be able to identify various farm, construction and processing machinery and explain the various applications of those pieces of equipment. Students will be able to differentiate different components and systems within equipment. Students will be able to select, recommend and manage equipment based on different needs. Student will be able to identify factors that influence production timelines, and improvements that can be made by machine usage. Students will identify and communicate key aspects associated with equipment usage.
- 4. Contribution of course to meeting the professional component:** This course contributes three (3) credit hours toward meeting the minimum 48 credit hours of basic-level curriculum for the Bachelor of Science Degree in Agricultural Operations Management.
- 5. Relationship of course to program outcomes:** From the list of (I) through (IV) program outcomes listed below, this course addresses outcomes (I), (III), and (IV). **Of these, (I) and (III) will be assessed.**

Program Outcomes:

- I. an ability to select and apply a knowledge of mathematics, science, and technology to management challenges that require the application of principles and applied procedures or methodologies;
- II. an ability to function effectively as a member or leader on a technical team;
- III. an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature;
- IV. an ability to engage in, and to understanding of the need for professional development.

- 6. Instructor:** Richard V. Scholtz, III
 - Office location: 107 Rogers Hall
 - Telephone: 352-392-1864 x 107
 - E-mail address: rscholtz@ufl.edu
 - Web site: <http://www.abe.ufl.edu/rscholtz>
 - Office hours: Monday, Wednesday, and Friday (2:45 – 3:45 pm) or by appointment.
- 7. Teaching Assistant:** Bhagatveer Sanga
 - Office location: 141 Rogers Hall
 - E-mail address: bssangha21@ufl.edu
 - Office hours: Monday, Wednesday, and Friday (11:00 am – 12:00 pm) or by appointment.

8. **Lecture Meeting Times:** Tuesday and Thursday - Period 4 (10:40 – 11:30 am)

9. **Laboratory Meeting Times:** Tuesday - Periods 7-9 (1:55 – 4:55 pm)

10. **Meeting Location:** 110 Rogers Hall.

11. **Textbooks, Materials and Software Required:** (no required text, notes will be provided on the course's web site and UF E-learning page)

1. Any scientific calculator.
2. USB Flash Drive (≥ 1 GB) for use in this course only.
3. Daily Calendar (e.g. Daytimer), PDA, phone or laptop computer w/ calendar application.
4. Access to Microsoft Office 2007 or compatible Office Suite (word processor, spreadsheet, presentation programs compatible with the *.docx, *.xlsx and *.pptx formats).
5. Large 3-ring binder for notes.

12. **Source Materials:**

1. Bowers, Wendell, Benjamin Angus Jones, and Elwood F. Olver. 1973. Engineering applications in agriculture. Champaign, IL: Stipes.
2. Deere & Company. 2012. John Deere 7130 and 7230 Tractors. Moline, IL: Deere & Company.
3. Finner, Marshall F. 1969. Farm field machinery. Madison, WI: College Print. and Pub.
4. Hunt, Donnell, and Lester W. Garver. 1973. Farm machinery mechanisms. Ames, IA: Iowa State University Press.
5. Juvinall, Robert C., and Kurt M. Marshek. 1991. Fundamentals of machine component design. New York: J. Wiley.
6. Krutz, Gary, Lester Thompson, and Paul Claar. 1984. *Design of agricultural machinery*. New York: Wiley.
7. Liljedahl John B., Liljedahl John B., Turnquist Paul K., Smith David W., and Hoki Makoto. 2004. Tractors and their power units. St. Joseph, MI: American Society of Agricultural Engineers.
8. South, David W., and Jon R. Mancuso. 1994. Mechanical power transmission components. New York: Marcel Dekker.
9. Srivastava, Ajit K., Carroll E. Goering, and Roger P. Rohrbach. 1993. Engineering principles of agricultural machines. St. Joseph, MI: American Society of Agricultural Engineers.
10. Vickers, Incorporated. 1998. Vickers mobile hydraulics manual. Rochester Hills, MI: Vickers, Inc.

13. **Course Outline:**

Date	Lecture Topic	Laboratory Topic	Assignments
January 7	Course Introduction	Laboratory Introduction	---
January 9	History of Agricultural Machinery	---	Engine Cycles
January 14	Power	Power Calculation Assignment	---
January 16	Nebraska Tractor Testing	---	Power
January 21	Tire Selection	<i>Tractors</i> [‡]	---
January 23	Tractive Efficiency	---	Traction
January 28	Estimating Tillage Draft Requirements	<i>Tractors and Tillage Implements</i> [‡]	---
January 30	Tillage Selection	---	TBD
February 4	Tractors and their Features	Comparison of Tractor Performances	---
February 6	Mechanical Power Transmission	---	Transmission I
February 11	Fluid Power Transmission	<u>Student Presentations</u> [†]	---
February 13	Review	---	Transmission II
February 18	More Power Transmission	<u>Exam I</u> [*]	---
February 20	Fuel Usage Estimation	---	Fuel Comparison

February 25	Skid Steer and Backhoe Loaders	<i>Skid Steer and Backhoe Loaders</i> [‡]	---
February 27	Seeders and Planters	---	TBD
March 10	Field Capacity and Efficiency Estimation	<u>Student Presentations</u> [†]	---
March 12	Review	---	---
March 17	Field Capacity and Efficiency Estimation	<u>Exam II</u> [*]	---
March 19	Component Reliability	---	Field Capacity and Efficiency
March 24	System Reliability	<u>Student Presentations</u> [†]	---
March 26	Specialty Harvesting	---	Carbon Credits
March 31	Live Stock Machinery	<u>Student Presentations</u> [†]	---
April 2	Equipment for Controlled Environment	---	System Reliability
April 7	Forage Harvesting Equipment	<i>Seeders and Planters, and Harvesting Equipment</i> [‡]	---
April 9	Review	---	Field Losses
April 14	Grain Harvesting Equipment	<u>Exam III</u> [*]	---
April 16	Total Cost of Ownership and Value of Machine Storage	---	---
April 21	Final Review/Special Topics	<u>Student Presentations</u> [†]	---
April 30	Optional Final Exam–7:30am [*]	---	---

*Examinations will be composed of two equally weighted parts. Part I consists of True/False, Matching, Fill in the blank and short answer questions. Part II consists of between four and six multiple part calculation questions.

†All students must be prepared to a presentation starting on the first day of the dates scheduled, only the instructor will know the order, make-ups will only be entertained in cases of extreme emergencies or for schedule conflicts reported prior.

‡These laboratory periods will be in the field, most will be conducted at the Plant Science Research and Education Center at Citra, Fl. **All students must wear both long pants and closed-toed shoes to these labs.** Attendance is mandatory during these periods. In some cases students will be required to have read machinery operators manual, and to have passed a short competency quiz prior to attending the lab.

14. Attendance and Expectations:

Attendance is required – Lectures will cover material from various references, so it is imperative that students make every effort to attend classes and take good notes. Students are especially encouraged to ask questions during lectures. A part of most class periods will be used for teams to meet and coordinate their projects. Teams will maintain a record of attendance.

All deliverables will comply with the requirements and due date specified at the time of assignment (no deliverable will be made due earlier than 3 business days after assignment). **No late deliverable will be accepted.**

The student is expected to manage their time efficiently, and should anticipate spending three times the length of lectures studying and preparing deliverables outside the classroom. The student should focus on the following: assignments, preparing both laboratory reports, review of notes and lecture materials, and any additionally assigned readings.

This class will predominately utilize USCS units, though there is some interaction with SI units. Mastery of both systems is strongly suggested.

15. Announcement Policy: Students will be held responsible for *all* announcements made in class, which includes *any and all* changes to this syllabus and the course lecture schedule. Students are expected to attend all lectures and laboratory periods scheduled.

16. Grading Policy: Official individual grades will only be available at the end of the semester. While many project grades will be determined at the completion of each project, individual grades will be modified based on team and self-assessments conducted throughout the semester.

600 points – Examinations.

There will be three equally weighted examinations throughout the semester. Examinations will be composed of two equally weighted parts (100 points for each part). Part I consists of True/False, Matching, Fill in the blank and short answer questions; questions will test the students grasp of nomenclature, ability to identify equipment and components, and ability to identify concepts related machine selection, in particular the key factors that influence production and performance. Part II consists of between four and six multiple part calculation questions; each question will focus on those concepts related machine selection, in particular the key factors that influence production and performance.

100 points – Homework Assignments.

There will be eleven homework assignments (lowest score will be dropped) that will range from requiring the students to do independent research, to guided coursework that will reinforce. All assignments are due 1 week after they are assigned (unless otherwise noted), and should be submitted electronically.

200 points – Laboratory Assignments.

*There will be eight laboratory assignments. The majority of laboratory assignments will consist of attendance, participation, and an executive summary on what was covered. Other laboratory assignments will consist of in-class assignments geared assuring students are comfortable with the level of mathematics necessary for success in this class. Many laboratory periods will be in the field, most will be conducted at the Plant Science Research and Education Center at Citra, FL. **All students must wear both long pants and closed-toed shoes to these labs and attendance is mandatory during these periods for a grade.** In some cases students will be required to have read machinery operators manual, and to have passed a short competency quiz prior to attending the lab. All assignments will be turned in at the end of the lab period (unless otherwise noted).*

100 points – Student Presentation.

Each student will prepare and deliver a presentation, to cover a piece of agricultural, construction, or industrial equipment. Each presentation will last between 18 and 22 minutes. All students must be prepared to a presentation starting on the first day of the

dates scheduled, only the instructor will know the order, make-ups will only be entertained in cases of extreme emergencies or for schedule conflicts reported prior. Students will have the opportunity to assess the performance of teammates. Student participation and attendance will be monitored.

17. Grading Scale:

A:	921-1000 Points
A-:	891-920 Points
B+:	861-890 Points
B:	821-860 Points
B-:	791-820 Points
C+:	761-790 Points
C:	721-760 Points
C-:	691-720 Points
D+:	661-690 Points
D:	621-660 Points
D-:	591-620 Points
E:	< 590 Points

18. Make-up Grade Policy: The arrangements for-make any assignments should be made before the date in question unless there is an emergency situation. In which, reviews will be on a case by case basis.

19. Professionalism and Academic Honesty: Students should also strive to think and act as professionals. Students should extend all guests both professional and common courtesy. The instructor reserves the right to assess penalty points toward the class, or toward individuals who have chosen to disregard these guidelines.

Students will be *strictly held* to the University of Florida's policy on Academic Honesty. Suspected violations will result in no points awarded (failure) for the deliverable, and the offending student will be referred to the Dean of Students Office and Office of Student Judicial Affairs. Dropping or replacing the lowest grade will not be an option under these cases. Any and all disputes regarding the suspected infraction will be handled by the Student Judicial Affairs according to Regulations of the University of Florida.

In the process of enrolling and registering for classes at the University of Florida, every student has signed and presumably understands the following statement: "I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University." The following information will be placed on examinations. On my honor, I have neither given nor received unauthorized aid on this examination.

20. Evaluation Process: 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.bluer.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

- 21. Accommodation for Students with Disabilities:** Students requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation the level and type of accommodation of required to meet the student's disability.
- 22. UF Counseling Services:** Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
 - University Counseling Center, 301 Peabody Hall, 392-1575, Personal and Career Counseling.
 - SHCC mental Health, Student Health Care Center, 392-1171, Personal and Counseling.
 - Center for Sexual Assault/Abuse Recovery and Education (CARE), Student Health Care Center, 392-1161, sexual assault counseling.
 - Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.
- 22. Use of Library Materials:** These items are university property and should be utilized with other users in mind. Never remove, mark, modify nor deface resources that do not belong to you. If you're in the habit of underlining text, do it only on your personal copy. It is inconsiderate, costly to others, and dishonest to use common references otherwise.
- 23. 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. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.