STA 3032 - UFO Program (Class number 17471)

Spring 2022

Engineering Statistics

Instructor: Linda Davis

Office: (No on-campus office)

E-mail: LindaDavis@ufl.edu

Course Website: e-Learning (Canvas)

Course Material

Teaching will be asynchronous except office hours. Material will be provided via the Canvas course website. Please note: The lecture notes, PowerPoint slides, and lecture videos for this course were developed by another faculty member, Dr. Demetris Athienitis.

- The lecture notes do deviate from the primary textbook on some topics, and you are responsible for material as taught in the lecture notes.
- Slides: Brief slides based off the class notes.
- Videos: Pre-recorded videos. (By Dr. Athienitis)

Required Text(s)

1) (Textbook) *Probability & Statistics for Engineers & Scientists*, 9th Edition available via UF All Access; **Author(s):** Walpole, Myers, Myers, Ye; **ISBN-13:** 978-0134115856
2) (R Supplement) *The Book of R;* free access to e-book available through UF library; **Author(s)**: Tilman M. Davies; **ISBN-13:** 978-1593276515

Course Communication

- Discussions (Link available in course website.)
- Live office hours via Zoom. (Times and link available in course website.)
- E-mail for questions regarding course policies. (Please ensure that **STA 3032** is in the subject line. Failure to do so may result in a non-response.)

Materials and Supply Fees

- Please note that this course will be participating in the UF All Access program. Login at the following website and Opt-In to receive your required MyLab Statistics access code, which will be used to register within Canvas. https://www.bsd.ufl.edu/AllAccess/
  Codes can also be purchased at the bookstore, but at a higher cost. There will be discounted loose-leaf texts available in the bookstore, but only the access code is required. Step-by-step instructions will be posted in Canvas for registering the access code.
- Honorlock for proctoring. (Free)

Course Description

A survey of the basic concepts in probability and statistics with engineering applications. Topics include probability, discrete and continuous random variables, confidence interval estimation, hypothesis testing, correlation, regression, and analysis of variance.

Prerequisite(s): MAC 2311

Credit Hours: 3

Software

The statistical software used in this course is R, along with the RStudio interface.

Course Goals and Objectives

1) Access, manipulate, and analyze data using statistical software.
2) Produce appropriate graphs and descriptive statistics for one and two variables, for both categorical and continuous data.
3) Interpret graphs and descriptive statistics for one and two variables.
4) Apply basic probability rules.
5) Understand the concepts of expected value and variance for discrete and continuous random variables.
6) Apply the Central Limit Theorem, which is crucial for inference.
7) Understand confidence intervals and hypothesis tests.
8) Carry out and interpret one-sample and two-sample analyses for means and proportions.
9) Carry out and interpret statistical modeling using multiple regression and analysis of variance.

Course Policies

The instructor reserves the right to update any parts of this syllabus as necessary.

Students will promptly be notified of any changes.

Demeanor

All members of the class are expected to follow rules of common courtesy in all classroom discussions and email messages. Please refer to expected class netiquette posted on the "Start Here" page on the course website.

Assessments

Assessments in this course include online assignments (via MyLab Statistics), projects, R-assignments, quizzes, and exams.

Assignments and Projects

The following activities are associated with most modules in the course.

MyLab Statistics Assignments include both textbook-like exercises and conceptual questions.

Projects based primarily on textbook exercises.

R Assignments based primarily on exercises from *The Book of R*.

For these activities,

- All due dates are posted on the course website. All **deadlines are at 11:59 pm** of the due date. Late submissions will be accepted at most two days after the deadline with a 20% penalty. After two days pass the due date, a zero will be given. Exception to this late policy will be considered on a case-by-case basis and only under extenuating circumstances.
- Students are expected to work independently, unless otherwise specified in writing. **Offering** and **accepting** solutions from others is an act of **plagiarism**, which is a serious offense and **all involved**

parties will be penalized according to the UF Student Honor and Conduct Code.

- Discussions amongst students about MyLab Statistics assignments, projects, and/or R-assignments are encouraged. However, if there is any doubt about the discussions being honor/conduct code violations, direct your questions to the instructor.
- Students are expected to show and explain their work.
- All electronically **submitted work must be as one merged file**. In Canvas, all uploaded files automatically get a grade of 0, until graded.
- Feedback will be provided within three business days after the deadline.

Quizzes and Exams

Quizzes are associated with most modules in the course. Exams are administered after completion of certain modules. Quizzes and Exams include conceptual and applied questions. Quizzes have between 5 and 7 questions, and exams have between 20 and 23 questions. Be sure to study the material and familiarize yourself with the procedures posted in the course website prior to each quiz/exam.

- All due dates are posted on the course website. All **deadlines are at 11:59 pm** of the due date.
  - Quizzes will be available at least one week prior to being due. Quizzes will be accepted up to two days after the deadline with a 20% penalty. After two days pass the due date, a zero will be given.
  - Exams are available only for a two-day window. Exams will not be accepted late.

  Exception to the late policies for quizzes and exams will be considered only under extenuating circumstances approved by the instructor.
- Students must work alone on quizzes and exams. Any collaboration is a serious offense and **all involved parties will be penalized according to the** UF Student Honor and Conduct Code.
- Except for the Orientation quiz, quizzes and exams will be administered via Honorlock. For (more) complete information about Honorlock, please visit the "Start Here" page of the course website. *Due to the nature of online quizzes and exams via Canvas, technical issues may arise and although we try to implement fail-safes, please try to plan accordingly by saving work, documenting issues, and preparing materials ahead of time.*
- Quizzes are timed with a duration of 35 minutes; exams are timed with a duration of 75 minutes. For both quizzes and exams, 15 minutes is provided for the Honorlock startup. **Timed quizzes and exams are automatically submitted when time expires.**
- Only one attempt.
- It is highly encouraged to use a reliable device with **a reliable internet connection**. Being disconnected means that you are no longer being supervised which could potentially mean that your quiz/exam will not be graded.
- Feedback will be provided within three business days after the deadline.

Allowed Material on Quizzes and Exams

- Instructor-provided formula sheets and R-reference sheets available via the course website. It is recommended to have these materials ready and printed ahead of time (in case of technical issues).
- Access to R and/or WolframAlpha (when needed) provided through the quiz/exam.
- One sheet of blank scratch paper.

Exam Dates

Exam #1 Available starting February 17th at 12:00 am; due February 18th at 11:59 pm.

Exam #2 Available starting March 24th at 12:00 am; due March 25th at 11:59 pm.

Exam #3 Available starting April 19th at 12:00 am; due April 20th at 11:59 pm.

Grading

Course Score

Exams 1, 2 and 3	30%	100 points each. Conditional weighting: 5% lowest score, 10% second best score, 15% best score.
Quizzes	20%	11 quizzes (including the Orientation Quiz); 10 points each; lowest quiz score dropped.
Projects	25%	10 projects; 25 points each.
R assignments	15%	6 assignments; 25 points each.
MyLab Statistics Online Problems	10%	10 online problem sets; 25 points each.

Letter Grade Assignment

There will be *no rounding up* of scores.

		A	91 to 100	A-	87 to < 91
B+	84 to < 87	B	80 to < 84	B-	77 to < 80
C+	74 to < 77	C	70 to < 74	C-	67 to < 70
D+	64 to < 67	D	60 to < 64	D-	55 to < 60
E	< 55				

Final grades shown in the course website are not accurate because they do not account for the conditional weighing of exams.

To view the result of the letter grades to your GPA, please visit the UF Grade and Grading Policies.

Make-up

Requirements for class attendance and make-up exams, assignments, and other work in this course as well as policies regarding absences, religious holidays, illness and student athletes are consistent with UF Attendance Policies.

Additional Make-Up Policy for Exams

- Every effort should be made to complete the exam during the two-day open period. Only extreme situations will warrant a make-up. Contact the instructor prior to the exam - as soon as you realize you will be unable to take the exam at the scheduled time. Each case will be reviewed individually. Valid and detailed documentation is a prerequisite for scheduling a make-up under such extenuating circumstances.
- If you have an emergency on the exam due date, the instructor must be contacted by midnight of the day the exam is due.
- Make-ups need to be scheduled within a week from the exam due date. You are responsible for scheduling.
- Additional Note: Being on vacation or booking a trip prior to the completion of the semester is not a valid reason to request a make-up. Please reference the most recent Academic Calendar.

Addressing Issues

Technical Difficulties

Please contact the UF Help desk via e-Learning "Help" tab or UF IT Service Portal. Any requests for extensions due to technical issues must be accompanied with appropriate documentation/proof including screenshots and communication with the help desk. You MUST contact your instructor within 24 hours of the technical difficulty if you wish to request an extension.

Grievances/Commendations

Should you have any grievances or commendations with your experience in this course, you can address them:

- to the instructor at LindaDavis@ufl.edu, or
- the Department of Statistics.

For issues that are not satisfactorily resolved at the department level, or which seem to be broader than one department, students are referred to the Office of the Ombuds.

UF and CLAS Policies

Dropping, Withdrawal, and Incomplete

Dropping and Withdraw

For policies concerning late course drops and course withdrawals, check the catalog.

Incomplete

An incomplete grade may be assigned at the discretion of the instructor as an interim grade for a course in which the student has completed a major portion of the course with a passing grade but is unable to complete course requirements before the end of the term due to extenuating circumstances. A student must obtain agreement from the instructor and arrange for resolution of the incomplete grade in the next term. Instructors are not required to assign incomplete grades. For complete details, please visit CLAS incomplete grade policy and contract.

Accommodating Students with Disabilities

Students requesting accommodations for disabilities must first register with the Disability Resource Center (DRC). The DRC will provide documentation to the student who must then provide this documentation to the instructor. You must submit this documentation prior to submitting any assessments for which you are requesting accommodations.

U Matter, We Care

U Matter, We Care offers care related resources and programs focused on health, safety, and holistic well-being.

Academic Misconduct

Students are held accountable to the UF Student Honor and Conduct Code.

Evaluations

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/

Tentative Course Outline

In the following table, a week is considered to start on Monday and end the following Sunday, starting with January 10-16th as Week 1. Spring Break week is not counted.

Module	Week	Lecture	Topics	Notes	Textbook	Projects Quizzes
"Start Here"						Orientation Quiz
1	1	1	Summary Statistics: Location and Spread	1.1-1.3	1.1-1.5, 1.7	1
		2	Graphical Summaries	1.4	1.6	
2	2	3	Sample Space, Events and Probability	2.1-2.2	2.1-2.2, 2.4-2.5	2.1
		4	Counting Methods: Permutations and Combinations	2.3	2.3	
		5	Conditional Probabilities and Independence	2.4	2.6, 2.7	
	3	6	Random Variables (RV): Discrete and Continuous	2.5.1	3.1-3.3	2.2
		7	RV: Expectation, Variance and Percentiles	2.5.2-2.5.4	4.1-4.2, 4.4	
		8	RV: Joint and Conditional Distributions	2.5.5-2.5.7	3.4, 4.1	
		9	RV: Covariance and Linear Combinations	2.5.8-2.5.9	4.2, 4.3	
	4-5	10	Random Variables: Binomial, Geometric, N.B., Poisson	2.5.10	5.1-5.2, 5.4-5.5	2.3
		11	Random Variables: Uniform, Normal, Chi-Square, t, F	2.5.11	6.1-6.4, 6.7, 8.5-8.7	
		12	Central Limit Theorem	2.6	8.1-8.4	
		13	Normal Probability/Quantile Plot	2.7	8.8	
Exam 1						
3	6	14	Inference on Population Mean: Confidence Intervals	3.1.1	9.1-9.5	3.1
		15	Inference on Population Mean: Hypothesis Tests	3.1.2	10.1-10.4	
		16	Inference on Population Proportion	3.2	6.5, 9.10, 10.8	
	7	17	Inference on Population Variance	3.3	9.12, 10.10	3.2
		18	Distribution Free Inference: Sign and Wilcoxon	3.4	16.1-16.2	
4	8-9	19	Inference on Two Population Means/Proportions: Confidence Intervals	4.1.1	9.8, 9.9, 9.11	4
		20	Inference on Two Population Means/Proportions: Hypothesis Tests	4.1.2	10.5, 10.9	
		21	Inference on Two Population Variances	4.2	9.13, 10.10	
		22	Distribution Free Inference: Wilcoxon and Levene	4.3	16.3	
		23	Contingency Tables: Test of Independence (Pearson)	4.4	10.12	
Exam 2						
5	10-11	24	Simple Linear Regression (SLR): Model Fit	5.1.1-5.1.2	11.1-11.4, 11.8	5.1
		25	SLR: Inference	5.1.3-5.1.6	11.5-11.6	
		26	SLR: Checking Assumptions and Power Transformations	5.2	11.10	

	12	27	Multiple Regression (I): Model Fit	5.3.1-5.3.2	12.1-12.2, 12.4, 12.11	5.2
		28	Multiple Regression (II): Individual and Simultaneous Tests	5.3.3	12.5-12.6	
		29	Qualitative Predictors	5.4	12.8-12.9	
6	13-14	30	Completely Randomized Design (CRD): Model and Inference	6.1.1-6.1.2	13.1-13.3	6
		31	CRD: Post Hoc Comparisons	6.1.3	13.6	
		32	Randomized Complete Block Design (RCBD): Model and Inference	6.2.1-6.2.2	13.7-13.8, 13.11	
Exam 3						