STA 3032 (Class number 19737)

Spring 2020

Engineering Statistics UFO

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Course Website: e-Learning

Course Notes: Available online. Notes do deviate from textbook and you are responsible for material as taught in the notes.

Course Communication: Via e-learning. It usually takes less than 24 hours on weekdays and less than 48 hours on weekends for responses so please try to plan ahead.

- Check course website *daily* for up to date announcements.

- Discussion forum in e-Learning.

- Live conference hours posted and updated on course website. No hours during UF holidays.

- E-mail for questions regarding course policies. (Ensure that **STA 3032** is in the subject line. Failure to do so may result in a non-response.)

Required Text(s):

1. *Probability & Statistics for Engineers & Scientists*, 9th Edition
   Author(s): Walpole, Myers, Myers, Ye; **ISBN-13:** 978-0134115856

2. The Book of R
   Author(s): Tilman M. Davies; **ISBN-13:** 978-1593276515

Materials and Supplies 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 MyStatLab access code, which will be used to register within Canvas. - https://www.bsd.ufl.edu/G1CO/IPay1f/start.aspx?TASK=INCLUDED – Codes can also be purchased at the bookstore, but at a higher cost. Any code obtained outside of UF All Access will not work for the course. 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 during exams.

- LockDown Browser for quizzes.

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: You will need a computer for the homework assignments and practise. The main software used in class will be R.

Course Goals and Objectives:

1. Access, manipulate and analyse 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. Know and apply the basic probability rules, the concepts of expected value and variance for discrete and continuous variables.

5. Know and apply the Central Limit Theorem, which is crucial for inference.

6. Understand confidence intervals and hypothesis tests.

7. Carry out and interpret one-sample and two-sample analyses for means and proportions.

8. Carry out and interpret statistical modeling using multiple regression and analysis of variance.

9. Know and apply basic quality control procedures.

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, email messages, threaded discussion and chats. Please refer to expected class netiquette online and during class.

Assignments

- All **deadlines are at 23:59** of the due/end date. These are ***hard* deadlines** meaning that any open or ongoing assignments will automatically be submitted at the deadline. For example you should not start an assignment at 23:58. No late assignments will be accepted under any 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 Honor Code**. Discussion amongst students is encouraged, but when in doubt, 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 the teaching assistant grades them.

- Feedback will provided within two business days from the assignment deadline.

Projects/Quizzes

Under each module in e-Learning,

- **Projects** that are based on (primary) textbook exercises.

- **R assignments** that are based on the (secondary) textbook exercises.

- **Quizzes** that are *timed* and range from conceptual to applied.

All deadlines are posted on e-learning. **Assignments are automatically submitted at deadline even if in progress.**

Exams

After the completion of certain modules, exams will be administered via Honorlock. For (more) complete information about Honorlock please visit the "Start Here" page of the class website. *Due to the nature of online exams via Canvas, it is important to keep in mind that technical issues may arise and although we try to implement failsafes, please try to plan accordingly by saving work, documenting issues and preparing any material ahead of time.*

- Exams are timed with a duration of 75 minutes (60 minutes with up to 15 minutes provided for the startup) and will be available for about 3 days. Be sure to study the material and familiarize yourself with the procedures prior to the exam as time is limited. Start the exam at least 75 minutes before the hard deadline.

- Exams are available on the class page in Canvas for which you realistically have **only 1 attempt**.

- It is highly encouraged to use a **reliable device** with a **reliable internet connection**. Being disconnected means that you are no being longer supervised which could potentially mean that your exam will not be graded.

- Formula sheets and an R reference sheet are provided (ahead of time) and it is recommended to have the material ready and available ahead of time (in case of technical issues, such as broken links).

- Each question will have a text window for which to write your answer. Math equations can be added in much the same way as in the discussion forum, in that they both use LaTeX. So please familiarize yourself with inserting math equations in text windows. For practise please visit https://www.codecogs.com/latex/eqneditor.php. Practice sets will be provided in the same format.

Important dates:

Exams windows begin at 09:00 the first day and end at 23:59 on the last day.

Exam #1 (Module 1&2)	February 21-23
Exam #2 (Module 3&4)	March 20-22
Exam #3 (Module 5&6)	April 24-26

Allowed material:

- Instructor provided formula sheet and R-reference sheet provided in e-Learning course page.

- Permissable software during the exam are: Excel, R, R Studio, and the website Wolframalpha

- Two sheets of scratch paper.

Grading

Grade distribution:

Exams 1, 2 and 3	33%	(8% lowest, 10% second best, 15% best)
Quizzes	20%	(lowest quiz dropped)
Projects	30%	(lowest project dropped)
R assignments	15%	(lowest assignment dropped)
StudyPlan (Pearson)	2%	(MyLab Statistics 80% completion)
Total	100%	
Extra Credit	0-2%	(class and discussion forum participation)

Final grade and can be calculated using:

$$\text{Final} = 0.08(\text{worst exam}) + 0.10(\text{second best exam}) + 0.15(\text{best exam})$$
$$+ 0.30\left(\frac{\sum \text{projects} - \text{lowest}}{90} \times 100)\right)$$
$$+ 0.20\left(\frac{\sum \text{quizzes} - \text{lowest}}{100} \times 100\right)$$
$$+ 0.15\left(\frac{\sum \text{R assignments} - \text{lowest}}{50} \times 100\right)$$
$$+ 0.02\,(\text{StudyPlan})$$
$$(+\text{Extra})$$

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 on e-Learning 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 requirements:

- Every effort should be made to complete the assignment/exam during the open period. Only extreme situations will warrant a makeup. Contact the instructor prior to the exam - as soon as you realize you will be unable to take the assignment/exam at the scheduled time. Each case will be reviewed individually. Valid and detailed documentation is a prerequisite for scheduling a makeup under such extenuating circumstances.

- If you have an emergency on the day of the assignment/exam, the instructor must be contacted by midnight of the day of the assignment/exam.

- Make-ups need to be scheduled within a week from the assignment deadline. Student is 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 makeup. 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 make-ups 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 a make-up.

Grievances/Commendations

Should you have any girevances or commendations with your experience in this course you can always address them

- to the instructor at athienit@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 Student Complaints On-Campus or On-Line Students Complaints

UF and CLAS Policies

Dropping, Withdrawing and Incomplete

Dropping and Withdraw

For late course drops and course withdrawals please visit
https://catalog.ufl.edu/UGRD/academic-regulations/dropping-courses-withdrawals/

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, been unable to complete course requirements before the end of the term because of extenuating circumstances, and obtained agreement from the instructor and arranged 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 policies and forms.

Accommodating Students with Disabilities

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

Academic Misconduct

Students are held accountable to the UF Honor 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

⋆ Additional topics included

Mod.	Week	Content	Notes	Video	Textbook	Projects/Quizzes
1	1	Summary Statistics	5-9	1	1.1-1.5	1
		Graphical Summaries	9-16	2	1.6	
2	2	Sample Space, Events and Probability	17-21	3	2.1-2.2, 2.4-2.5	2.1
		Counting Methods	21-24	4	2.3	
		Conditional Probabilities and Independence	24-28	5	2.6, 2.7	
	3	Random Variables: Properties (I)	28-32	6	3.1-3.3	2.2
		Random Variables: Properties (II)	32-36	7	4.1-4.2, 4.4	
		Random Variables: Properties (III)	36-39	8	3.4, 4.1	
	4	Random Variables: Properties (IV)	39-45	9	4.2, 4.3	
		Random Variables: Binomial, Geometric, N.B., Poisson	46-50	10	5.1-5.2, 5.4-5.5	2.3
		Random Variables: Uniform, Normal, Chi-Square, t, F	50-59	11	6.1-6.4, 6.7, 8.6-8.7	
	5	Central Limit Theorem	60-62	12	8.3-8.4	
		Normal Probability/Quantile Plot	62-64	13	8.8	
Exam 1						
3	6	Inference for Population Mean (I)	65-69	14	9.1-9.5	3.1
		Inference for Population Mean (II)	70-74	15	10.1-10.4	
	7	Inference for Population Proportion	75-76	16	9.10, 10.8	
		Inference for Population Variance	77-80	17	9.12, 10.10	3.2
		Distribution Free Inference (I)	81-86	18	16.1-16.2	
4	8	Inference for Population Means: Confidence Intervals	87-92	19	9.8, 9.11	4
		Inference for Population Means: Hypothesis Tests	93-95	20	10.5, 10.9	
		Inference for Population Variances	95-98	21	9.13, 10.10	
	9	Distribution Free Inference (II)	98-102	22	16.2-16.3	
		Contingency Tables: Test of Independence (Pearson)	102-106	23	10.12	
Exam 2						
5	10	Simple Linear Regression (I)	107-112	24	11.1-11.4, 11.8	5.1
		Simple Linear Regression (II)	112-116	25	11.5-11.6	
	11	Checking Assumptions and Transforming Data	116-123	26	11.10	
		Multiple Regression (I)	123-126	27	12.1-12.2, 12.4	5.2
	12	Multiple Regression (II)	126-134	28	12.5-12.6	
		Qualitative Predictors	134-140	29	12.8-12.9	
6	13	Completely Randomized Design (CRD)	141-145	30	13.1-13.3	6
		CRD: Post Hoc comparisons	145-148	31	13.6	
		Randomized Block Design (RBD)	148-152	32	13.7-13.8, 13.11	
Exam 3						
Time Allowing	14	CRD: Distribution Free	-	33	16.4	
		RBD: Distribution Free	-	34	⋆	

8